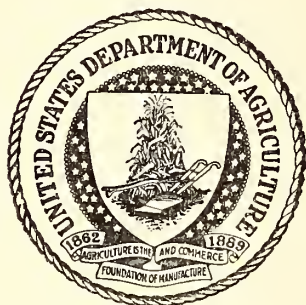


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Agriculture IN THE *Americas*



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February 1941

OFFICE OF FOREIGN AGRICULTURAL RELATIONS
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OUR JOB . . .

In the past 10 years the American republics have drawn together in a hemispheric fellowship for mutual defense and mutual welfare. In 1936 the International Conference of American States for the Maintenance of Peace was held at Buenos Aires. There were established new bases of united action by the American nations. At the Eighth International Conference of American States at Lima, Peru, in 1938 it was affirmed that any attack upon one American nation would be considered an attack upon all of them. A year later the Ministers of Foreign Relations of the American republics met at Panama and set the 300-mile-limit neutrality zone and other rules of conduct in the event of violation of the neutrality of the American republics. The Ministers of Foreign Relations met again at Havana in 1940 and in the "Declaration of Havana" developed still further the policies determined at the Panama conference by setting up machinery for handling colonies of non-American nations in the event that ownership should be transferred. They also decided upon plans for economic cooperation.

The political foundation for cooperation among the American republics has thus been laid. We have in the Americas a cooperative program among all nations based not on power politics and mutual suspicion but on good neighbor principles.

Our hemispheric "Declaration of Havana" recognized the necessity of fitting economic factors into the programs for hemispheric cooperation and defense. When economic cooperation is considered we have to think first of agriculture, the foundation of the life of the Americas. There needs to be a better understanding of the agricultural problems of each country as a basis for developing complementary agricultural production and for dealing with agricultural commodities which are produced in surplus. Such a development will help greatly to strengthen the economic structure and defense of the hemisphere.

The Department of Agriculture for many years has been a leader in strengthening agricultural and economic cooperation among the Americas. The issuance of this new monthly periodical called "Agriculture in the Americas" is another step which the Department is taking to diffuse current knowledge as a basis for the improvement of cultural and commercial relationships along the agricultural front of the American republics. Its purpose is to provide information on the agriculture of the hemisphere and the agricultural programs and policies of the governments of the American republics.

There is no doubt that the Americas are going to live more closely together. As changes occur we will want to learn more about each other. From our cooperation may well come the most important contribution of our time to the civilization of man. We sincerely hope that "Agriculture in the Americas" will play a part in this development.

CLAUDE R. WICKARD,
Secretary of Agriculture.

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Can The Americas Live Alone?

by JOSEPH L. APODACA

Robinson Crusoe was lucky!

When Robinson Crusoe chanced upon Juan Fernandez Island, he faced a deficit problem of major proportions. Marooned and alone in that wilderness, the problem of wresting a subsistence from nature challenged his ingenuity to the limit. But Robinson Crusoe was lucky. He had his creator, Daniel Defoe, in command of the situation.

Suppose we in the Western Hemisphere were cut off from the rest of the world and left to our hemisphere resources. This is not so far-fetched an assumption as it sounds. With the American nations determined to preserve peace and independence in the midst of war, action to provide a strong defense for this half of the world already has been taken. Plans call not only for adequate land, sea, and air power, but for economic measures, designed to weld the hemisphere into a unit capable of withstanding any form of penetration.

In this connection we face, like Robinson Crusoe, a serious deficit problem for a number of essential raw materials. But we are also caught in the throes of a surplus situation with respect to certain other agricultural commodities which nations of the Western Hemisphere produce in common. These difficulties threaten hemispheric solidarity. They may weaken the links of hemispheric defense unless we can do something about them.

A detailed study of the subject which this article summarizes will appear in the March issue of FOREIGN AGRICULTURE.

The possibility of our being cut off from sources of essential commodities or to division from within by conflicting economic interests,

is only part of the reason for desiring a greater coalescence of the hemisphere economies. Greater solidarity on the part of peace-loving democracies of the New World is important to defense right now. It would be just as important should the American republics ever have to deal with a United Europe dominated by one ruler with one trade policy.

There must be adequate export outlets to maintain production at a level of abundance. For these the American nations doubtless will rely upon each other to a growing extent. But only if the way is paved for a sound and lasting inter-American trade. Let us consider the possibilities of achieving this trade by examining the hemisphere's deficits and surpluses and the effect these have on trade development.

What We Need But Don't Have

RUBBER.—We are literally a nation on wheels and rubber is essential to keep those wheels moving. Although three-fourths of the natural rubber we use goes into tires, thousands of other products require it, too. (See p. 7.)

Despite the tremendous demand in the United States for natural rubber, there is no production in this country and approximately 98 percent of our imports come from the Far East. Average annual imports, 1937-39, were 503,644 long tons. Less than 2 percent came from tropical America—the original source of rubber.

QUININE.—Like rubber, quinine is a native of tropical America. Although a number of substitutes have been found in recent years, quinine is recognized as of strategic importance. Since the outbreak of the present war, in order to build up stocks, imports of both the cinchona bark and derivatives have reached record levels.

A recent Presidential proclamation prohibits reexport from this country without special permit.

The seeds of the cinchona tree were taken from South America by the Dutch and planted in Java. Extensive plantations and efforts to control all cinchona exports have enabled the Netherlands to build up a virtual quinine monopoly. In recent years United States imports have averaged 1,738,000 pounds per year, worth (on the basis of import values) about \$735,000. Less than 2 percent of our quinine imports come from countries in the Western Hemisphere.

COCOA.—Europe hadn't heard of cocoa until the discovery of America.

Though a native of tropical America, cocoa, like rubber and cinchona bark, was transplanted to other areas, notably the West Coast of Africa. But unlike rubber it is still grown extensively in the Western Hemisphere. In 1895, approximately 86 percent of the world production was in the Americas, but in 1939 the American countries produced only 39 percent. Average annual imports into this country in recent years have amounted to 578,642,000 pounds of cocoa and cocoa beans with an estimated average value of \$33,361,000. About 48 percent of this total is supplied by tropical America, the remainder coming from Africa and the Netherlands Indies.

TEA.—Among beverages in the Western Hemisphere, tea is second in importance only to coffee. The Far East (Ceylon, Netherlands Indies, Japan, and British India) is the source of about 95 percent of United States' tea imports. In the years 1937-39 our imports amounted to an average of 91,327,000 pounds per year, for which we paid \$20,256,000 annually.

TAPIOCA.—Tapioca is known as "mandioca" in Brazil, "yuca" in Cuba, and as "casava" in the Far East. From the large roots of the plant comes a starch, some of which is prepared and used as food under the name of arrowroot and tapioca, and some is made into casava or mandioca flour and meal. The latter is used in making bread, cakes, and certain other pastry prod-

ucts. Other uses for this starch include the manufacture of mucilage for postage stamps and envelopes, for sizing textiles, and for making paper and adhesives.

This easily cultivated plant is a native of Brazil. It was transplanted to Ceylon in 1786 and to India probably long before that. It also has been successfully introduced into tropical regions of Africa and the Malay Archipelago. The Netherlands Indies are the major source of supply. Imports into the United States in recent years have averaged 348,832,000 pounds with an estimated value of \$5,830,000 per year. Less than 4 percent of this comes from Latin American countries.

Pillow Stuffing and Fish Poison

KAPOK.—The demand for kapok will probably be stimulated by the rearmament program. The kapok tree—another native of tropical America—yields a soft, flexible material long used by the natives to stuff pillows, mattresses, and chairs. In addition to these uses, kapok is now employed in the making of life preservers, water wings, sleeping bags, and insulation material. It has a buoyancy greater than cork, is resilient and water-resistant.

From the American tropics the kapok tree was transplanted to the East Indies, the Philippines, Ceylon, Indo-China, and Africa. Today 92 percent of United States kapok imports come from these areas. Of the 9,114 tons we bought during the 1937-39 period, valued at \$2,474,000, less than 5 percent came from Latin America.

ROTEXONE.—This is the basis of one of the most valuable insecticides. It is found in the roots, leaves, and stems of certain tropical plants known, according to species, as "derris," "barbasco," "cubé," and "timbo." For hundreds of years the natives of the Far East and tropical America used the leaves and roots of this plant as a fish poison.

Imports of rotenone-bearing plants into the United States show a progressive increase from 2,412,576 pounds in 1937 to 5,138,882 pounds,



Pan American Union photo.

Fibers grow plentifully in many Latin American countries. This field of henequen is in Guatemala.

valued at \$521,152, in 1939. Estimates indicate that in 1940 imports will be around 7,000,000 pounds. This is equivalent to 35,000,000 pounds of finished insecticide. Tropical America supplies about 65 percent of the imports but practically all of the remainder comes from the Far East.

FIBERS.—Types of fibers used in the manufacture of United States naval cordage, ropes, cables, binder twine, sacks, and mats, important in view of our imports, include sisal, henequen, manila hemp or abacá, and ordinary hemp. Imports of these four during the last 3 years averaged 159,000 tons per year, worth an estimated \$16,348,000. We also import about 56,000,000 pounds of binder twine each year, valued at \$3,000,000.

From Latin American countries comes 42 percent of the imports of sisal and henequen fiber, less than 1 percent of the manila or abacá, and 7 percent of the ordinary hemp. Of the imports of binder twine, only 33 percent comes from Latin American countries. Important suppliers

are the Netherlands Indies, Africa, the Philippines, and Italy. Recent surveys show that all the fibers mentioned can be produced in much larger quantities in Latin America.

FATS AND OILS.—Although the Western Hemisphere is nearly self-sufficient with regard to fats and oils, substantial deficits exist in some categories.

Among the vegetable oils, chief deficits apply to coconut oil and copra, palm, olive, and peanut oils. The total deficit of these approximates 1,668 million pounds per year. In addition to their usefulness as food, these oils are essential in the manufacture of quick-lathering and hard soaps. Besides the oil, there are also imports of palm nuts and kernels. These are processed in the United States and the oil is used in making soaps, chocolate products, pharmaceuticals, and perfumes. Imports have averaged 40,294,000 pounds in recent years and originate largely in Africa and the Far East.

Deficits of industrial oils apply primarily to tung and perilla oils. These two are almost

indispensable in the manufacture of high-quality varnishes and have other industrial uses.

Imports of coconut oil and copra come largely from the Philippines and the East Indies. Peanut oil and tung oil are furnished primarily by the Far East, principally China. The East Indies and West Africa are the principal sources of palm oil and palm kernels while Europe is the source of olive oil. Shipments of perilla oil originate in Kwantung and Japan.

Latin America has two outstanding oils, babassu and cohume, which could be used to replace a number of the vegetable oils mentioned. There are also some coconut palm plantations in tropical America. It is believed that certain species of tung and oiticica, natives of tropical America, can produce large quantities of the industrial oils needed in this hemisphere.

NUTS.—Hemisphere deficits exist for cashew nuts and to some extent for coconuts. Annual imports into the United States of these two have in recent years had an average value of \$4,361,000, with about 5 percent coming from American countries. While both coconuts and cashews enter primarily for food purposes, they also are turned into industrial channels. Coconut shells are used in making gas masks, water containers, and a number of decorative objects. Cashews yield a cooking oil and from the shell is extracted a fluid used in varnishes, brake lining, typewriter rolls, and machine tools.

Latin America supplies less than half of our imports of coconuts, less than 1 percent of the cashews.

NATURAL SILK—Despite a growing number of substitutes for silk, the natural product still constitutes an important deficit product in this hemisphere. Cortez, in 1522, is credited with the first attempt to establish the silk industry in the Western Hemisphere, but his efforts in Mexico failed. There have been attempts in recent years to produce silk in Ecuador and Brazil although not commercially.

United States silk imports in the 3-year period, 1937–39, amounted to an average of 54,862,000 pounds per year with an average value of \$105,416,000. The Far East, principally Japan, furnished 97 percent of this total.

That most of the deficit products mentioned, while natives of Latin America, have not held their own there and that distant areas are far more important in supplying our present requirements was to be expected as a result of the economic liberalism and comparatively free international trade of the nineteenth and early twentieth centuries. Hurdles that Latin America failed to jump were the limited supply of labor in relation to the vast natural resources, and the scarcity of capital and technicians necessary to develop commercial production. These hurdles meant higher costs in Latin America than in tropical British, Dutch, and French possessions. As a result, interest waned in tropical production and attention was turned, wherever possible, to semitropical and temperate-zone products. The commercial production of cotton, grains, livestock, fruits, vegetables, and like products flourished—aided considerably by that same economic liberalism which, until the late twenties, made it possible to sell growing quantities of these products in Europe and in other parts of America.

Here Are the Surpluses

Today a different framework of international trade exists. With their former foreign outlets seriously interrupted, the American nations find themselves with huge surpluses of certain foodstuffs and agricultural items produced in common by two or more nations of this hemisphere. There are two alternatives in dealing with these surpluses. One is to let prices seek their own level, regardless of economic consequences and repercussions on hemispheric solidarity. The second involves some form of collective action by the producing countries, designed to cushion declining prices and bring about more effective marketing. Let's see what these commodities

are, the extent of the surplus of each, and the countries contributing.

GRAINS.—Wheat, corn, and linseed are the grains of which hemispheric surpluses are substantial. From 1935 to 1938, importing countries of this hemisphere took annually about 67,507,000 bushels of wheat. The exporting countries, however, in addition to meeting their own needs and the hemisphere requirements, had an annual surplus which averaged 260 million bushels, destined for areas outside the hemisphere. Canada furnished 57 percent of this export surplus, Argentina 36 percent, and the United States 7 percent.

Of the average corn exports of the hemisphere, destined for other areas, amounting annually to 252 million bushels, Argentina supplied the entire quantity. In the case of linseed, Argentina (95 percent of the total) and Uruguay have accounted for the average exports of 45 million bushels going to countries outside the hemisphere.

FIBERS.—Huge hemispheric surpluses exist with respect to cotton and wool. Importing countries in the New World take only about 518,000 bales of cotton a year. After these requirements and the needs of exporting countries are met, an amount equivalent to about 7 million bales annually must be disposed of in other than hemisphere markets. In addition to these hemispheric exports, the United States had an annual carry-over of cotton that in the same period amounted to an average of 7 million bales per year. Of the hemisphere's export cotton surpluses, the United States has supplied 75 percent, Brazil 16 percent, Peru 5 percent, Argentina 2 percent, and Mexico 2 percent. With respect to wool, the average exports from the hemisphere to other areas amounted to 211 million pounds per year during the 1935-38 period, of which Argentina and Uruguay supplied 90 percent, with Chile, Peru, and Brazil accounting for the remainder.

LIVESTOCK PRODUCTS.—The Western Hemisphere depends on other areas to absorb its exports of meat, meat products, hides, and skins. An average of 1,240 million pounds of beef and beef products is exported annually to outside markets. Over 90 percent of this goes to Europe, supplied principally by Argentina, some by Uruguay and Brazil. Mutton and lamb exports in recent years have amounted to an annual average of 122 million pounds, supplied entirely by Argentina (86 percent) and Uruguay. Hides and skins, too, are largely a matter of Argentine exports, with Brazil, Uruguay, and Canada contributing lesser portions of the total of 357 million pounds per year. Hemisphere exports of hog products are estimated to have been 403 million pounds per year during the 1935-38 period. Of this total Canada furnished 46 percent, the United States 40 percent, Argentina and Brazil the remainder.

Plenty of Apples, Oranges, Pears

FRUITS.—To sell export surpluses of oranges, apples, and pears, the Western Hemisphere has depended on outside markets. This has applied annually to a volume of 6.5 million boxes of oranges, 16 million boxes of apples, and 3 million boxes of pears. The United States and Brazil account for almost all of the orange exports: the United States, Canada, Chile, and Argentina supply the apples. The export surplus of pears originates in the United States, Argentina, and Chile. In the case of all three the United States is the leading source.

TOBACCO.—Tobacco appears in intrahemisphere trade to some extent, for there are a number of producing countries, like the United States, which export some types of tobacco and import certain other complementary types. After all this intrahemisphere trade is accounted for, however, there has still remained in recent years an average of 469 million pounds per year for outside markets. Of this, the United States has supplied 77 percent, Brazil 15

percent, Cuba 6 percent, and the Dominican Republic 2 percent.

SUGAR.—During the period, 1935–38, importing countries in the Western Hemisphere took annually about 3,713,000 short tons of sugar. The United States and Canada absorbed the bulk of these imports. The exporting countries, after supplying their own requirements and those of the importing American countries, have still had an export surplus of about 127,000 short tons annually. Cuba has accounted for about 76 percent of this surplus, while the Dominican Republic, Peru, Brazil, and Haiti have supplied the remainder.

COFFEE.—Coffee is exported by more countries of the Western Hemisphere than any other surplus product. Importing countries of the New World take over half of the hemisphere's supply, averaging 1,894 million pounds per year between 1935 and 1938. In addition to supplying these requirements, the exporting countries sold about 1,167 million pounds to outside areas. In estimating the export surplus of the hemisphere, there should be added the coffee destroyed by Brazil because of a lack of profitable markets. Between 1935 and 1938, this amounted to approximately 245 million pounds of coffee per year.

In the period considered, Brazil accounted for about 69 percent of the hemispheric surplus of coffee, while Colombia, Guatemala, Venezuela, Mexico, and Costa Rica, in the order named, supplied the bulk of the remainder.

Completing the Picture

It is significant to note that the value of our imports of the 12 groups of commodities mentioned as deficits averaged about \$428,654,000 in the period 1937–39, only 6 percent of which originated in Latin America. This indicates the extent to which our purchases might expand from Latin America, were such products purchased there. In turn, during the period 1935–38, the value of the hemisphere's export surpluses of the 15 commodities considered here

(based on unit values corresponding to United States imports or exports of similar articles in 1938) is estimated at \$1,380,000,000 a year. These surpluses bring into bold relief the competitive characteristic of agriculture in the Americas. They reveal a problem which, in the interest of hemispheric solidarity, cannot be left unattended.

On the deficit front the most important line of action includes the production in tropical America of deficit crops which complement present United States production and for which a profitable market exists in the United States. This is a long-range undertaking.

Congress appropriated \$500,000 last summer for the development of rubber production in tropical America. In addition to rubber research, exploratory surveys undertaken during the past 3 years in Ecuador, Paraguay, Haiti, and Colombia, at the request of these nations, indicate that excellent possibilities exist for expanding production of many other tropical crops mentioned as hemispheric deficits.

Among measures designed to relieve the burden of hemisphere surpluses the most noteworthy is the Inter-American Coffee Agreement, signed last November by 15 American republics including the United States. The essential feature of this agreement is the allocation of basic quotas. (See p. 15.)

The idea of international commodity collaboration has been applied on a world-wide basis with respect to a number of important items of international commerce such as tin, rubber, and sugar. There must eventually come appropriate measures designed to make surplus products available to the underprivileged citizens of the American democracies who can not afford them at present prices.

The current war has focused attention on hemispheric rather than world-wide cooperation. There can be little doubt that this cooperation will make it increasingly possible for the Americas to live alone, if necessary.

Spooling of Rubber...



Defense rolls on rubber.

U. S. Army Signal Corps photo.

by EDGAR R. BURKLAND

It's news to many of us that the bounce in our rubber heels comes from a tree in the Dutch East Indies. Or that the rubber in our raincoats travelled 10,000 miles to keep us dry.

So familiar are we with rubber heels, rubber tires, rubber raincoats, and a thousand other rubber products that we seldom consider rubber itself. The adequacy and availability of the United States rubber supply, or what would happen should that supply suddenly be cut off, has never worried most of us.

To the tire manufacturer of Akron and Los Angeles, to the boot-and-shoe maker of New England, to the manufacturers of a host of other rubber products, this matter of an adequate rubber supply is vital at all times. In normal peace-time a continuous supply is necessary. In war-time it is imperative.

Unlike many other necessities which we produce in abundance, rubber happens to be one which we do not. A product indispensable to our national economy, the vast bulk of it is now produced in the British and Netherlands East Indies, Ceylon, French Indo-China, and Thailand. These areas are located as much as 10,000 miles from our shores and the continuation of their prewar economic and political status, in the light of current history, should not be taken for granted.

True, we have made rapid strides during recent months in developing and perfecting synthetic products to meet any serious emergency that might arise, but production costs still are at least twice those of the natural product. From a struggling industry a century ago, giving employment to perhaps a hundred persons, an industry

with an output totaling possibly \$20,000 annually, the rubber business has grown steadily. Employing more than 120,000 workers in 1939 the industry produced a wide variety of products valued at \$900,000,000.

It is centered in the State of Ohio which accounts for about 40 percent of the entire output of rubber products. Other states important in United States rubber manufacturing are California, Massachusetts, Pennsylvania, and New Jersey.

By 1910 the rubber industry here had begun to assume a vital economic role. The fast-developing motor car industry was established and the crude rubber production with scientific methods was becoming firmly entrenched in the East Indian plantations. Up to 1910 our rubber had come mainly from the wild trees of South America and Africa. From 1910 on, the well-developed and well-managed plantations of the Far East were to play an increasingly important part in crude rubber production. In a few years wild rubber was practically out of the picture.

Automobile tires form the largest single outlet for crude rubber imported into the United States.

Recent statistics reveal that out of 45 million motor vehicles registered in the world, 68 percent are registered in the United States. More than 70 percent of all the passenger cars in the world are owned in the United States. About 54 percent of the world's trucks travel United States highways. During the four decades of this century we have manufactured some 79 million motor vehicles of one kind or another. When we say we are a nation on wheels we are not kidding.

The number of tires required for the motor industry is tremendous. Due, however, to the fact that improved lasting qualities have been built into tires during recent years, giving them three to four times the mileage available before, a significant trend has been noted in the proportion of rubber consumed in this branch of the

industry. In 1929, of the total consumption of rubber in the United States, 86.6 percent was used in the manufacture of tires and inner tubes. By 1937 this figure had dropped to 72.9 percent, in spite of vastly increased automobile production.

New outlets for rubber are being discovered every year. One of the most important is the use of rubber in the making of tires for farm implements. Other articles in which rubber has been found to be suitable include seat cushions, arm rests, and mattresses, and in aircraft construction where minimum weight is important.

Several concerns in the country are now making rubberized hair for upholstery purposes. Others are using latex in shipping containers, leather tanning, lubricating oils, glove manufacture, self-sealing envelopes, antishattering materials, road expansion joints, and food wrappers.

U. S. Capital Invested

It is true that United States capital has been invested in foreign rubber plantations, but so far the amount produced has been small. The American-owned-and-controlled properties are located in the Netherlands Indies, British Malaya, Liberia, and the Philippines in the Eastern Hemisphere, and in Panama, Costa Rica, and Brazil in the Western Hemisphere. Only the plantations in Central America and Brazil lie outside the current "danger zone."

Not only have we relied almost entirely on foreign nations to produce our rubber for us but, until recent months, we have also depended upon others to transport the raw material to us. In 1938 about 50 percent of the rubber imported was transported in British vessels, with Dutch cargoes amounting to 25 percent, American 20 percent; Japan and others carrying the rest. American-borne imports rose to 24 percent by the end of the first quarter of 1940 and have increased now to well over 50 percent. If we must continue to depend on the Far East for our

rubber supply it is going to become more and more necessary to go and get it.

Due to the mechanization of armies and the increased importance of aircraft, rubber today has assumed a more important defense role than ever. If present plans materialize, the automotive industry soon will be turning out defense products at the rate of \$40,000,000 worth a year. Military motor trucks provide the largest single outlet for defense rubber. Contracts call for at least 25,000 trucks by the end of 1941. Army trucks have from 4 to 10 wheels, requiring from 5 to 12 tires per unit, including spares. The proposed truck-buying program alone will require tires and tubes costing several millions.

Second to trucks as a consumer of defense rubber are airplanes. Rubber for these may cost as much as \$8,000,000 this year. Other articles made from rubber for national defense include garuents, collapsible boats, barrage and observation balloons, and rubber tracks for high-speed tanks.

What is the present status of supplies and what possible measures can be considered for averting the serious hardships which might result from a drastic and sudden curtailment of our rubber supplies?

The problem has been anticipated and steps have been taken to keep the wheels of our rubber industry turning should the emergency come. Important surplus stocks in addition to our normal requirements are being acquired constantly from overseas sources.

Created by Congressional authority June 25, 1940, the Rubber Reserve Company has arranged to obtain 330,000 tons of rubber as an extra supply by the end of 1941. Also, up to December of last year, deliveries were made on practically all of the 33,000 tons involved in a cotton-rubber deal between the United States and England. The operation of the Rubber Reserve Company is through a six-man committee which includes representatives of five of the largest rubber manufacturers. Purchasing is carried

on in the open market in such a manner that fluctuations will be avoided as far as possible. In order to make such purchases, \$140,000,000 in loans to this agency have been authorized by the Reconstruction Finance Corporation.

The possibility of establishing a synthetic rubber industry as a solution to problems which may arise has been mentioned. Although synthetic rubber products have not developed overnight, it is only during recent years that serious study has been given them.

Some of these products now possess excellent qualities—qualities which make them superior in certain respects to the natural product for limited purposes. Properties claimed for one usually are lacking in others. Greater resistance to abrasion, to the deteriorating effects of sunlight, heat, oxygen, gasoline, and certain acids are claimed. Improved dielectric qualities, lessened permeability to gases, and reduced combustibility are also noted. The problem of heat resistance, especially important in tires used on high-speed trucks, has not yet been solved by synthetics.

Synthetics Have Limited Future

In the manufacture of special products where the specific qualities of synthetics are desirable and where the cost of the raw material is not a dominant factor, there is a real future for the new industry. The total production of synthetic rubber of all types in the United States in 1939 probably did not exceed 2,500 tons. This still is a small amount compared to the 600,000 tons of crude rubber necessary in normal times to meet requirements in the United States.

That the mushrooming of the synthetic-rubber industry, at present in its infant stage, is the permanent solution to our future rubber needs is not at all certain. The Bureau of Foreign and Domestic Commerce of the United States Department of Commerce has aptly pointed out that "when it is realized that natural rubber can probably be produced at about 5 cents a pound and that at present (1939) a price of 12 to 15

cents a pound in New York permits a profit to plantation owners on the other side of the world, it will be understood that synthetic rubber products must meet a serious price competition in order to supplant the natural product."

It has been demonstrated that crude rubber can be produced at 5 cents a pound on plantations and under conditions not as favorable as they might have been. High-yielding rubber trees, developed in the past few years, will undoubtedly increase efficiency of plantation rubber production and could be a factor in further reduction of costs.

To establish a new industry, requiring an immediate outlay of at least \$200,000,000 for equipment, to produce a product which can be obtained more cheaply from other sources is, to say the least, controversial. Logically, it should be attempted only after all practical solutions have been eliminated.

It must be remembered that the price of rubber has fluctuated widely in the past. Each 5-cent increase in the price of rubber raises our rubber bill by as much as \$30,000,000 a year.

During periods of high rubber prices in the past we have resorted to reclaiming rubber in larger quantities than is ordinarily the practice. Such will surely be the case in the event of a future rubber shortage. Reclaimed rubber is now being used in large quantities in the manufacture of sponge-rubber products, offering such advantages as economy and flexibility in processing. That a large reserve of reclaimed rubber does exist can be appreciated when we realize that 2 tons of scrap rubber will yield 1 full ton of "reclaim." In 1939 about 186,000 tons of reclaimed rubber were produced, with a rubber content of approximately one-half. Compare this with 592,000 tons of original crude rubber. The cost of reclaiming does not vary greatly aside from market fluctuations in the scrap-rubber market. The present maximum production capacity of reclaimed rubber in the United States is estimated at more than 300,000 tons annually.

Are there sources in the United States which might supply rubber in commercial quantities in the event of urgent need? There are hundreds of trees, shrubs, plants, and vines growing in this country which yield latex in varying amounts. For two reasons these can be practically dismissed from serious consideration. In the first place, scientists have learned that the rubber content of the latex found in most plants in temperate regions is much lower than that of tropical plants. Secondly, the high labor cost in the United States and the expensive processes which must be employed in reducing latex to rubber are prohibitive.

Of all the plants growing outside the tropics only one, the guayule shrub, native to the drier regions of southern Texas and northern Mexico, has ever produced rubber in any significant quantities.

What About Tropical America?

How much rubber can be obtained from the wild rubber trees in tropical America? The largest amount of rubber ever produced in the Western Hemisphere was 62,891 tons in 1910. Of this amount the Amazon Valley accounted for nearly 38,000 tons and Mexican guayule 9,500 tons. In 1939 crude-rubber shipments originating in these areas totaled some 17,000 tons, of which nearly 14,000 tons were shipped from the Amazon region and 2,200 tons from Mexico.

The sparseness of these wild trees is the reason why rubber production declined in the American tropics while scientific methods of cultivation succeeded on the Far Eastern plantations. Without regard for cost of production, it is possible that thousands of tons of wild rubber could be gathered and exported yearly from the Amazon area.

We have examined some of the possible solutions to be considered in the event of serious curtailment of our present rubber supplies.

Let us look into the possibilities of scientific rubber production in the native home of the



Tapping a rubber tree in Costa Rica.

Goodyear photo.

rubber tree—the Amazon Valley—and other suitable tropical areas in the Western Hemisphere. There are millions of acres suitable for rubber production from the standpoint of soil, climate, rainfall, transportation, and accessibility. Labor, while not found in such abundance as in the Asiatic regions, could be recruited in fairly large numbers.

Considerable attention has been given to the South American leaf disease, and scientists believe that disease-resisting strains now being developed eventually will eliminate this malady. For many years scientists of the United States Department of Agriculture have worked with others in the development of high-yielding strains of rubber trees. Success has been achieved to the extent that there now are rubber trees available which will yield up to five times that of an average seedling of eastern plantations.

Among all the products being studied in the program to increase Latin-American agricultural production, none offers greater opportunities than rubber. The establishment of a successful plantation industry in the Western Hemisphere, along with the encouragement of other complementary crops, will go a long way toward improving the economic, financial, and social levels in many of these countries.

By taking advantage of the many resources in Latin America we will be supplying the nations to the south of us with purchasing power needed to create a solid foundation for lasting trade relations. It is an economic postulate that trade is not a one-way proposition. In order to export we must import, and we cannot sell to those who do not have the dollar exchange with which to buy from us.

(This article is the first of a series.)

Bolivia at the Crossroads



by PHILIP LEONARD GREEN

Bolivian Legation photo.

"Not many days ago, here in Bolivia, Germans, Italians, and Spaniards paraded in the uniforms of their respective European organizations, as if they were in Berlin, Rome, or Burgos, without respect for our nationality, government, or people." Thus writes a Bolivian rural educator in a recent letter.

Why this apparently keen interest in wooing a country without a seaport, this land which nature has made so inaccessible? For wooing it is, even if ineffective.

One striking impression which even a cursory observation of this large and remote country leaves is the way in which nature has operated to convert apparent drawbacks into potential advantages.

No country could be more rugged than Bolivia. Its almost impenetrable mountain ranges have made it, topographically speaking, a nation divided against itself. Yet these very rock formations, barriers though they may have been to transportation and communication, have provided much of the wealth upon which Bolivian economy has been built.

Tin, of course, is the chief source of this wealth. So large does it loom in the nation's exports (68 percent) that the metal and the country have become almost synonymous in the minds of outsiders who know anything at all about Bolivia. Experts have stated that Bolivian tin ores are complex; that they do not lend themselves as readily to the production of

good quality metal as do the ores of Cornwall or Malaysia. True or not, the United States must import increasing amounts of tin, both for defense and other needs, because tin is a metal for which no substitute has yet been found. If, in addition, the trade routes leading from non-American tin sources should be blocked, the importance of Bolivian tin would be even further increased.

Next in importance is silver, found generally at higher altitudes than tin, but often in the same formations. Silver at one time was Bolivia's most important source of wealth. Potosí, silver center of old, was known the world over as a byword for wealth and carefree spending. In fact, it was only after the decline of the silver industry had begun, around 1895, that tin production was started.

Other important mineral products of Bolivia are copper, lead, zinc, bismuth, tungsten, antimony, gold, mercury, nickel, petroleum, sulfur, and asbestos.

Bolivia is generally regarded as the classic example of a land-locked country. Much has been said and written concerning her loss of direct western sea outlets as a result of the war of the Pacific and of her attempts since then to gain more direct access to the world's markets in other directions. Yet here again Bolivia finds herself in a peculiarly advantageous position in the light of hemispheric defense problems. For Bolivia lies on what has been considered by some as the most logical route for a trans-South American railroad. The present trans-Andine railroad from Valparaíso, on the Chilean coast, to Buenos Aires, the Argentine capital, is closed at certain times of the year. At such times South America is completely without direct rail connections between the Atlantic and the Pacific. Then, too, there is always the danger that traffic through the Panama Canal might be halted in time of war.

Two stretches need to be built in order to insure through operation of this proposed trans-continental railroad. One is between Vila-Vila,

in the Cochabamba district and Santa Cruz de la Sierra, eastern Bolivia's largest city. The distance is 320 miles. The other is between Santa Cruz de la Sierra and Corumbá on the Brazilian border, now under construction, in accordance with a treaty between Bolivia and Brazil. The latter country already has a railroad operating from Corumbá eastward to the port of Santos on the Atlantic.

Since Bolivia's present economic condition does not permit her to finance both the work now in progress and the 320-mile stretch from Vila-Vila to Santa Cruz de la Sierra, her representatives proposed at the Havana Conference that the latter be financed as a hemispheric defense measure. The Conference approved. Preliminary surveys of this section have already been made.

Would Serve Two Purposes

While the plan's immediate value would be in the nature of defense insurance, its advocates claim one other important advantage—that it would encourage agricultural production by facilitating transportation to international markets. If this could be accomplished, obviously it would follow that additional buying power would be created in Bolivia for increased purchases abroad.

Due to the existence of tremendous mineral resources in Bolivia, agriculture has held a place of secondary importance ever since the Spanish conquerors came. The Indians, and to some degree the "cholos," have been left to wrest a living from the soil by primitive methods, much as did their ancient forebears. Thus, in a land where soil and climate combine to produce conditions favorable to a wide variety of agricultural products, we find that about \$2,000,000 worth of foodstuffs have to be imported annually.

Of course, this is not the only force which has operated to keep Bolivia's agriculture in a secondary place. There is the matter of population. The bulk of the country's people are in the highlands. Here is the major part of the

country's commerce and industry. The lowlands, on the other hand, are sparsely populated and neglected. Yet this is where the products which the country needs could be produced.

At present such agricultural activities as there are take place in three different areas: The plateau, the "Yungas" (on the eastern slopes and in the valleys of the Cordillera Real), and on the eastern plains.

The high altitude of the plateau region limits the kind of products which can be grown there. Only such hardy cereals as barley and quinoa thrive in that region.

The "Yungas" at present constitute the best developed agricultural region of the country. This takes in the Department of Cochabamba and, to a lesser degree, the Departments of La Paz and Sucre (Chuquisaca).

The region of greatest future possibilities, however, lies in the eastern plains, particularly the Departments of Santa Cruz and Beni. Among the products to which climatic conditions in this region are favorable may be mentioned sugarcane, rice and cotton.

Barley is grown in the plateau region and in the "Yungas." Then there is quinoa, also a native of this region. Quinoa is a hardy cereal. It is something like millet and has a small, round grain. It is used largely in making a nourishing soup.

In the Cochabamba and Sucre districts corn is grown in large quantities. Other districts grow corn in smaller amounts. A considerable part of the corn crop finds its way into "chicha," the native fermented drink. The boiled corn grains, known as "mote," are a basic food among the Indians in certain districts.

In the Santa Cruz and Beni regions small quantities of rice are now produced. Large tracts in this region could be planted to rice, yet Bolivia now has to import over 30,000 bushels of rice annually.

Sugar is another crop which is cultivated in Santa Cruz and El Beni, though the lower

"Yungas" valleys and other regions also produce it. El Beni and Santa Cruz grow only enough for their own needs now. At one time Santa Cruz supplied almost all Bolivia.

Small areas are planted to cotton in Mapiri, El Beni, Santa Cruz, and Sucre (Chuquisaca). Lack of transportation facilities accounts for the limited development of this crop.

Throughout the entire region, potatoes are grown. In fact, the so-called "Irish" potato is native to the Andean region.

Cacao is produced mainly in the Mapiri region and in the Departments of Santa Cruz, El Beni, and Sucre (Chuquisaca).

Bolivia is also suited to the cultivation of a wide variety of fruits, both tropical and semi-tropical. Present quality could be greatly improved by better growing methods.

Lumber, Quinine Are Important

The list of woods available in the Amazonian region of Bolivia is formidable. Lack of transportation facilities is largely responsible for making these vast resources unavailable to those parts of the country which need them and to buyers outside Bolivia. As it is, the highland section of Bolivia even has to import lumber from abroad.

The cinchona, source of quinine, is native to the Amazonian region of South America, part of which is in Bolivia. During the first half of the last century, cinchona bark was one of Bolivia's leading exports.

Bolivia is now intensifying her efforts to build up this new-old industry. In fact it is the only country in this hemisphere which grows cinchona trees and does processing for its own use.

Bolivia today finds herself at the crossroads, not only literally, insofar as her strategic position is concerned but figuratively, with regard to the manifold opportunities which the future seems to hold in store for her.

ALONG THE AGRICULTURAL FRONT

AMERICAN SOCIETY OF AGRICULTURAL SCIENCES

In response to a recommendation of the Eighth American Scientific Congress, meeting last May in Washington, D. C., there has been organized the American Society of Agricultural Sciences.

The Society was organized by Scientific Congress delegates from Argentina, Brazil, Chile, Colombia, Costa Rica, Cuba, Ecuador, Peru, Dominican Republic, Uruguay, Venezuela, and the United States. The objects of the Society will be to recognize agriculture as a basic industry of the Americas—a close tie between the American republics; to advance scientific agriculture in the republics through individual and collective effort; to provide a central organization for coordination of the agricultural sciences; to hold meetings, issue publications, and otherwise disseminate information; to provide for exchange of research findings, ideas and experiences among members, and to promote friendship among workers in agricultural sciences in the American republics.

Unusual interest has been shown in this organization in the chapter organized in Puerto Rico. Atherton Lee, director of the United States Agricultural Experiment Station there, reports that at the last count they had 120 paid-up members. There are 16 members from the station alone, Mr. Lee says.

PAN AMERICAN COTTON CONGRESS

A joint resolution was passed by the House and Senate, December 17, 1940 (Public Res. No. 110, 76th Cong.) authorizing the President to invite foreign countries to participate in the Pan American Cotton Congress at Memphis, Tenn.

BRAZILIAN ECONOMIC SURVEY

W. R. Schreiber, of the Department of Agriculture's Office of Foreign Agricultural Relations, is in Brazil to gather economic data on tropical export products other than rubber. Mr. Schreiber's trip will take him through the states of São Paulo, Bahia, Pernambuco, and the Amazon Basin.

An economic survey of the Brazil-nut industry will be Mr. Schreiber's main objective, but he will seek economic information on the production, processing, and commercial handling of various products other than rubber that are complementary to the agriculture of the United States.

15 NATIONS SIGN COFFEE PACT

Perhaps the most significant example of the new spirit of inter-American cooperation was the signing, November 28, 1940, of the first Inter-American Coffee Agreement. Signatories were the governments of Brazil, Colombia, Costa Rica, Cuba, the Dominican Republic, Ecuador, El Salvador, Guatemala, Haiti, Honduras, Mexico, Nicaragua, Peru, the United States, and Venezuela.

Two sets of quotas, agreed upon at the conference held in Washington, will be observed under the supervision of an Inter-American Coffee Board, composed of one delegate of each signing country.

To allocate the market of the United States for coffee among the various producing countries, basic annual quotas were set, principal suppliers being Brazil, with 9,300,000 bags (of 60 kilograms), Colombia with 3,150,000 bags, and El Salvador, with 600,000 bags.

Principal suppliers in the exportation of coffee to the markets outside the United States are Brazil, 7,813,000; Colombia, 1,079,000; and Venezuela, 606,000 bags.

NEW QUININE MIXTURE

As is the case with a great many of the drug and fiber-producing plants, one of the problems in the production of quinine from cinchona bark is the process of extraction and refinement.

Trade talk hints that a new mixture, Totaquine, contains nearly three-fourths of the pure alkaloids of cinchona bark, one-fifth of these being pure quinine. It is said to be only slightly inferior to pure quinine in effectiveness.

Best part of the talk is that Totaquine can be easily and increasingly produced in a number of Latin American countries, thus aiding materially the general program for the promotion of complementary agriculture in the Americas.

FOR INCREASED DAIRY PRODUCTION

Next to bread, milk is probably the most important foodstuff in the world. Many believe that Latin America's dairy industries could be vastly improved, increasing dairy production as well as making wholesome dairy produce available to more people.

With the encouraging stimulus coming from private industry in this country, there has been organized the Inter-American Committee for the Dairy Industries, with offices at 232 Madison Avenue, New York City. The avowed purposes of this committee will be to "increase the consumption of dairy products—decrease the production of agricultural surpluses—and enhance solidarity throughout the hemisphere." Members of the Advisory Committee and Governing Board are Roberts Everett (chairman), executive vice president of the Dairy Industries Supply Association, Inc.; Dr. Earl N. Bressman, assistant director, Office of Foreign Agricultural Relations, United States Department of Agri-

culture; J. L. Colom, chief of the Division of Agricultural Cooperation, Pan American Union; John C. McClintock, executive secretary of the Inter-American Development Commission; Fletcher H. Rawls, chief of the Foodstuffs Division, Bureau of Foreign and Domestic Commerce of the United States Department of Commerce; and Dr. E. C. Ernst, of the Pan-American Sanitary Bureau.

PAN AMERICAN CALENDAR

February 11-21.—At Bogota, Colombia, the Fourth South American Congress of Railways.

February 20, 21.—At Washington, D. C., the Fourth Annual Convention of Inter-American Bibliographical and Library Association.

March 5-8.—At Montevideo, Uruguay, the Second Pan American Congress of Endocrinology.

MORE COURSES FOR LATIN AMERICANS

In response to a questionnaire sent out by the Office of Foreign Agricultural Relations to United States Land Grant colleges, 22 of the 41 schools reported that they now have available agricultural courses especially attractive to Latin American students. Thirty-five of the colleges reported that they have programs and facilities designed to attract students from Central and South America.

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Henry Wallace—*Our Mutual Friend*

No one has taken a greater personal interest in strengthening the bonds of inter-American relations than Henry A. Wallace.

A year or so ago some thought it a little peculiar that the Secretary of Agriculture should spend his spare time learning Spanish. Some thought it a little out of place when they heard that he was building up the Agriculture Department's knowledge and understanding of the countries to the south of us. Today they no longer think these things peculiar. They praise Mr. Wallace's foresight.

His early recognition of the rising importance of Latin America was not so much the result of intuition as it was of straight thinking. It was not the first time that Henry Wallace has had a "hunch" that proved correct. During the war of 1914-18, he published forecasts of long-time price trends based upon experience during the Napoleonic and Civil wars and in these forecasts predicted the post-war agricultural decline.

Mr. Wallace comes by his deep interest in agriculture naturally. He is the son of Henry C. Wallace, Secretary of Agriculture under President Harding and the grandson of Henry Wallace, founder of the well-known agricultural journal, "Wallace's Farmer," of which all three Wallaces were editors.

He always has had a bent for persistent labor. In 1913 he started looking for a higher yielding strain of corn. Thirteen years later, by inbreeding and crossing the inbreds, he produced higher yielding corn than any of the open-pollinated types.

To the Department of Agriculture in 1933, as Secretary, Mr. Wallace brought a new working philosophy. The Department, he said, should continuously express itself in terms of action which will best conserve the soil, feed the cities, and build a farm civilization which will forever serve as the foundation of democracy.

Along with President Roosevelt and Secretary of State Hull, Mr. Wallace has been a consistent crusader for a working unity among the American nations. To his co-workers he has consistently expressed the belief that we must "make every minute of every day count toward building security around those sacred rights for which the peoples of this hemisphere stand."

In Henry Wallace, philosopher, scientist, and hard worker, pan-Americanism has its ideal disciple.



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Agriculture IN THE *Americas*



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March 1941

OFFICE OF FOREIGN AGRICULTURAL RELATIONS
UNITED STATES DEPARTMENT OF AGRICULTURE

Working Together . . .

It is becoming increasingly clear that agriculture cannot be divorced from the other elements of cooperation between the American Republics.

It is an undeniable fact that, under the disorganized conditions which exist in the world today, the Western Hemisphere is confronted with a serious problem of agricultural surpluses. Ways and means of alleviating the surplus situation constitute one of the most difficult economic problems which this hemisphere faces at this time. Every avenue toward a practical solution is being explored.

Stimulation of complementary rather than competitive forms of agricultural production presents definite possibilities. Readjustments of production, and agreements for the orderly marketing of surpluses, present another line of possible action. The Department of Agriculture is devoting its efforts to bringing about successful cooperation along these lines. Agricultural scientists and agricultural-relations experts are working hand-in-hand with representatives of Central and South American nations toward laying the ground work for a more orderly adjustment of the agricultural situation in this hemisphere.

Meanwhile, however, it is clear that only a substantial curtailment of production of surplus crops in this hemisphere could eliminate the very large degree of dependence upon market outlets outside this hemisphere which will continue to prevail. This fundamental fact has implications which call for still further cooperative effort in the interest of Western Hemisphere agriculture. What it means, in essence, is that this hemisphere will continue to have a large stake in the restoration of orderly conditions in other parts of the world, on terms which will not only protect the future of democracy but which will make it possible for these surpluses to be sold at remunerative prices.

Despite any alleviating measures that may be taken, the prosperity of the Western Hemisphere, and of agriculture in the Western Hemisphere, will for a good while to come be greatly affected by conditions in other parts of the world, as they affect the revival of a healthy flow of mutually advantageous trade.

"Agriculture in the Americas" provides a means of explaining in simple terms some of the outstanding phases of this problem of agricultural cooperation in this hemisphere.

Because of the emphasis upon industrial production, the farmer may not receive his full share of the international spotlight during these critical days of national defense preparation. We cannot lose sight of the fact, however, that, despite mechanization and modernization of today's armies, they still move on their stomachs. Farsighted measures of cooperation by Western Hemisphere agriculture at this time will serve both the interests of agriculture itself and those of our national and hemisphere defense.

NELSON A. ROCKEFELLER,
*Coordinator of
Commercial and Cultural Relations
Between the American Republics.*

As The Hemisphere Changes

by DR. EARL N. BRESSMAN

SUBTRACT agriculture from yesterday, from today, or from tomorrow, and see what it leaves you!

With balanced agricultural resources a nation or a hemisphere can exist alone. Without them, no nation can be strong.

From that standpoint we in the Western Hemisphere are particularly fortunate. The civilization of the Americas is an agricultural civilization. Our prosperity, our security is founded on the products of our soil. Our current welfare and our future greatness depend upon intelligent husbandry of that agriculture.

Because we all desire peace, because we all prefer democracy, and because we believe that the best way to maintain peace and sustain democracy is to be prepared to defend them, the nations of this hemisphere have made it plain to the rest of the world that they will stick together.

Since it is evident that the basis of Western Hemisphere economy is agriculture, it naturally follows that an exchange of agricultural products between the nations of this hemisphere must be fostered, not only during the present emergency but for generations to come. But agriculture in the Western Hemisphere has not developed along the lines conducive to the greatest amount of hemisphere trade.

For example, we in the Western Hemisphere produce much more than we can use of certain agricultural products—over a billion dollars' worth too much every year.

We in the Western Hemisphere produce too little of certain other agricultural products which we need—a half billion dollars' worth too little each year. That this item will trend upward is evidenced by the fact that during 1940 our

imports of rubber jumped 60 percent and actual consumption almost kept pace with that percentage.

The markets for our surpluses, markets in other parts of the world, are being cut off or seriously hampered. The need for secure sources of our deficit products is becoming more and more pressing. This means that our agricultural economy must be developed, must be changed, to permit a greater exchange of products throughout the American nations. The products we exchange must be ones we need to exchange. The farmers of the Americas are the ones who must effect this readjustment.

Preserving a Civilization

Because the figures involved in this admittedly vast problem run into a good many zeros, some people have a tendency to throw up their hands and say it can't be done. But remember—we are talking in terms of preserving a civilization. You can't put a dollar sign in front of Peace or Democracy.

The farmers of the United States have long been in full competition with the farmers of Argentina and Brazil in world markets for certain important crops. As the unit costs of United States farm products are lowered and the standard of living for Latin America is raised, production costs will reach an equilibrium. This process is slow. During the adjustment period, during these crucial times, various methods must be utilized to avoid hardships to all countries in this hemisphere. Inter-American agricultural cooperation must be developed to the advantage of all and the disadvantage of none. Changes occur no less in agriculture than in industry and



Andre Roosevelt photo.

On many of Latin America's hills, like these in Ecuador, cinchona and other plants needed by the United States can be grown.

we must be prepared to change with the times and the needs.

When we speak of agricultural cooperation with Latin America we are not reading from an economic treatise, nor are we drumming up something new just for the sake of salving an emergency situation.

For the past decade, beginning with the rise of the Good Neighbor Policy, there has been a steady trend toward developing closer relations with Latin America by strengthening the economic base of these relations. The administration has shown in numerous ways a genuine interest in and active support for development of this cooperation. The United States Department of Agriculture has had a long record of cooperative effort along lines of inter-American agricultural activity, extending back nearly a half century. In the last 5 years this activity has increased rapidly through the lending of agricultural experts to Haiti, Paraguay, Colombia, Ecuador, and other countries. It has culminated in the establishment of a Division of Latin American Agriculture in the Department.

The 76th Congress passed five outstanding laws designed to improve our relations with Latin America. These were laws authorizing the loan of experts to other American republics on request; to carry out the provisions of the Buenos Aires and Lima conventions; providing a \$500,000 appropriation for rubber research leading to increased production of this strategic material in the Western Hemisphere; establishing a scientific study center in the Panama Canal Zone; and a law increasing by \$500,000,000 the amount of loans which the Export-Import Bank may have outstanding to government and other agencies of the Western Hemisphere to assist in developing their resources, stabilizing their economies, and marketing their produce.

Regarding our relations with Latin America along agricultural lines, I visualize three methods of approach. First, there should be assist-

ance in the improvement of the domestic economy of each country.

Second, commodity cooperation with respect to the agricultural products of which there is a hemispheric surplus, such as coffee, sugar, cotton, and wheat, is indispensable. An example of this is the recent coffee agreement, wherein 15 countries of this hemisphere, including the United States, worked out a quota system on this crop. Of peculiar significance in this agreement is the inclusion of the United States, a nonproducing country, as one of the signatories. In the case of previous international agreements such as those on rubber, quinine, sugar, tea, and tin, the United States has had no voice as a consumer. It is hoped that this new pattern will be repeated in inter-American agreements relative to other great surplus crops.

Tropical Crops From A to Z

Third, there should be development of complementary agricultural products. The complementary products grown or that could be grown in the tropics of this hemisphere now number more than 100 and range from aloes to zapotes, in the tropics of this hemisphere now number production should be backed by both technical and financial assistance. To date, our technical assistance has been possible only in the case of rubber, but indirectly, through the loan of experts, we have been able to call to the attention of many Latin American governments the possibilities of a wide variety of these complementary products.

In regard to this third phase of agricultural relations I have been privileged to get some firsthand impressions. In trips I have taken through most of the countries of Latin America I have been deeply impressed with the wide variation in agricultural conditions. In the tropics, for example, the forests are not in pure stands—it seems as though every other tree is of a different type. Inasmuch as it is estimated that there are more than 4,000 species of trees in this area, a

mere botanical classification of them would present a stupendous task.

Our experts are familiar with the economic varieties of the flora, but what of the uncataloged plants in the countries of South America? Here the United States has a unique opportunity of combining cultural and economic relations. Before the war, the Germans, with their methodical thoroughness, were the recognized authorities on the plant life of Latin America. Expeditions into new territory had to send their specimens to Germany for identification and classification. Obviously, this gave the technical experts of Germany the first knowledge of new and useful plants in Latin America, and the principal collections of South American plants now are in Germany.

Neglecting The Fundamentals

To point out this condition is to call attention to our neglect of the fundamental factor in the future agricultural progress of Latin America. If new crops are to be developed, it is imperative that we know what species are available, and, as we have found in the past few decades, it is not only the cultivated species that are important but all the wild relatives as well. For in the wild plants reside the disease resistance and other qualities of stamina that are always needed as soon as a species is cultivated extensively.

The United States should certainly be the center of knowledge for all plant life in the Western Hemisphere, and it is our responsibility to see that we attain this position.

In the great Amazon watershed, which includes parts of Peru, Bolivia, Colombia, Brazil, Venezuela, and Ecuador, I was struck by the variety of the *Hevea* rubber trees. A commonly accepted classification of this genus gives 12 different species, but the great rubber-producing area of the Far East puts all its eggs in one botanical basket and calls it *Hevea brasiliensis*.

The possibilities in the production of natural

rubber exceed those contemplated in even the most fantastic theories concerning synthetic rubber. I was surprised to find one rubber species in Latin America that grows much like a bush, another producing a tree 50 feet in height, and still another so weak that it resembles a large climbing vine.

In an experiment conducted by one of the rubber companies it has been shown that 3 of these 12 species can be combined to produce a valuable plant. One species that is a strong producer of roots is used for the seedling, a second high-yielding species to produce the latex-forming trunk, and a third leaf-disease-resistant species for foliage. This is just an indication of the enormous possibilities in molding the germ plasm of the *Hevea* genus to perform a rubber-producing job that will exceed anything even dreamed of before.

In this same area I have been shown a great number of "fish-poison" plants. These are now coming into prominence because they produce rotenone in their roots. This chemical is non-injurious to man but poisonous to cold-blooded animal life and is invaluable as an insecticide. Already our plant explorers have collected hundreds of types of these fish-poison plants and have found at least one that greatly exceeds the average in rotenone content. This one selection makes the possibilities for commercial production of this product far greater than the most liberal forecasts of 5 years ago.

In looking at planting experiments with the cinchona tree, the source of quinine, in various countries of South America, I recalled the great number of economic plants that Latin America has given to the agriculture of the United States. We are indebted to Latin America for many valuable crops, including corn, potatoes, tomatoes, peanuts, strawberries, navel oranges, pineapples, coconuts, cassavas, sweetpotatoes, and tobacco. It is possible that there are others whose nutritive values we have not discovered.

Trees and plants indigenous to Latin America which enter into our commerce but which in most cases are not grown here include not only rubber, cashews, coca, cacao, but such exotic names as feijoa, granadilla, jaboticaba, imbu, and various anonas. In the field of ornamentals, the group which comes most readily to mind is that made up of orchids. In recent years, more than formerly, there have been extensive collections of cactus species brought up from South American countries to meet the growing interest in them. South American countries have contributed palms to southern Florida and southern California. Among ordinary garden plants introduced from South America are cannas, petunias, portulacas, salvia, and verbenas.

As I journeyed from Mexico to Brazil and Chile, I observed with great interest the beautiful cohune nut palm, indigenous to Central America. It produces an extremely valuable oil that is in demand but has not been exploited to any extent. In Colombia I was impressed with the possibilities—if machine-retting could be more nearly perfected—for the commercial production of at least two of their fiber plants, pita and fique. In northern Panama, as I looked at a thousand-acre planting of abaca (manila hemp) undertaken by the United Fruit Co. with the assistance of an expert of the Department of Agriculture, I visualized a vast business that might replace the banana industry, now failing as a result of the Panama disease and sigatoka.

In Paraguay I spent days studying the plantings of yerba mate, the South American tea, and mandioca, the plant that produces the so-called "poor man's bread." I was greatly interested in the wild pineapples in that country. Our experts are of the opinion that Paraguay is the home of the pineapple, since from that area radiate the greatest number of wild types. As I looked at the beautiful ceibas in Ecuador I thought of the kapok they produce which, because of its excellent insulating qualities, is being

used more and more in the air-conditioning industry.

In Brazil I was shown other palms that produce waxes used for floor and shoe polishes and for candles. From a palm also comes candelilla, an ingredient in the artificial ice for indoor skating rinks. Besides all these, there are hundreds of fruits, vegetables, and flowers. Most persons associate only bananas, citrus fruits, and pineapples with the tropics. In addition to these, which are grown in abundance, there are such exotic fruits as avocados, mangoes, chirimoyas, mangostines, and zapotes.

If We Don't, Others Will

A large number of well-known vegetables can be produced in Latin America during the winter season. And there are several vegetables, such as tropical yams, yucas, oca, and chayotes, which have never reached our tables.

One cannot visit Latin America's vast agricultural areas, or its huge forest regions, without coming away filled with enthusiasm and awe. It is inspiring to discover that we have, right in our own back yard, such a garden of agricultural resources. To help develop those resources is a challenge to our ingenuity and our patience.

Someone, some day, is going to develop those vast areas in Latin America. Other nations have turned hungry eyes in that direction. There is every reason why they should want to get their hands on such a rich storehouse.

The United States today is spending billions to prepare against military penetration of the Western Hemisphere. But there is also danger of economic penetration, against which tanks and guns are ineffectual.

The best way we can prepare to defend the Americas against economic penetration, and at the same time construct the basis for a mutually beneficial inter-American trade, is to cooperate with our Good Neighbors to the greatest possible extent in developing the green gold of their agriculture.

Charming Costa Rica

by PHILIP LEONARD GREEN

THERE is a high, volcanic mountain near the Costa Rican capital of San José. From it one can see both the Atlantic and Pacific Oceans. Out from the slopes of this mountain stretches one of the most versatile agricultural areas in the Americas.

Costa Rica embraces three distinct climatic zones. The first is the cool region (lands over 6,500 feet high). This zone has fewer people than any other part of the country. Temperature is between 41 and 59 degrees. Farming is difficult. Waterfalls and springs abound. Fruits and vegetables grow, but on a small scale. Here, too, the best cattle thrive.

Then comes the temperate zone (lands from 3,200 to 6,500 feet high). Most of this is in the central plateau. Climate is extremely healthful. Thermometers rarely register below 59 or over 77 degrees—almost an earthly paradise! Here live more people than in either of the other regions. It is the home of Costa Rica's best coffee, vegetables, cereals, and temperate-zone fruits.

Still lower, there is the hot zone (lands under 3,200 feet in altitude). This takes in plains along the oceans and rivers where temperatures range from 77 to 95 degrees and where humidity is high. On the Atlantic coast it rains about 300 days a year, while on the Pacific side the rainy season is from May to November. This is the land of bananas, cacao, sugarcane, tropical fruits, and fine woods.

With over a million acres given to cultivation and about six million acres to pastures, Costa Rica is a storehouse of agricultural products. Coffee, bananas, and cacao are the country's most important crops. Of these, coffee is the leader. Most of the "cafetales" or coffee fincas

are in small holdings owned by Costa Ricans.

This is one of the blessings of Costa Rica's economic set-up. The country was fortunate in being settled by large numbers of farmer-owners from northern Spain, rather than by relatively smaller numbers of wealthy or noble proprietors of the type who take little direct interest in developing the land. Most of these farmers sought the cooler regions which resembled their old environment in Spain. There they staked out claims for themselves. They settled down with their families to work their own land, much as did the pioneers of New England and the Middle West in the United States.

Democracy Is Traditional

Out of this grew the tradition of democracy which characterizes Costa Rica today. The procession of unfortunate political occurrences which too often mars the history of nations has been notably absent in the life of Costa Rica. "No home has ever been steeped in mourning by the acts of our political leaders," is a common Costa Rican saying. This democratic tradition can be traced to a number of factors. Important among them is the fact that Costa Rica was never a land of mineral wealth. Agriculture early became a way of life for the majority of settlers. This, together with the rapid decrease in the relatively small Indian population, prevented the setting up of huge "latifundios" or landholdings, worked by Indian peons, which have been so much a part of Spanish-American agricultural life, from colonial times to the present.

Costa Rica's first president, Juan Mora Fernández, was not a general but a teacher. This

has been true of most of Costa Rica's political leaders ever since. In fact, Costa Ricans say with pride that their country has more teachers than soldiers. In the last 10 years they have spent more than twice as much for education as for the maintenance of their army. Less than a half century ago 70 percent of the people could neither read nor write. Today illiteracy is down to 6 percent, according to Alberto Quijano Quesada, author of "Costa Rica, ayer y hoy." It is in the schools, open to all children, that the foundations of democracy have been laid.

First introduced from Cuba in the early nineteenth century, coffee soon became Costa Rica's leading product, surpassing even bananas and cacao, the country's staple crops since colonial times. It is estimated that Costa Rica now has about 37,000,000 coffee trees. Costa Rican coffee in normal times is sold mostly to Great Britain and Germany, where it is considered of superior quality and commands good prices. The loss of European markets has affected Costa Rican economy most unfavorably, tied as the country is to this one crop.

The Government maintains an Institute For The Defense of Coffee, established in 1933, to exercise general supervision over the country's coffee industry. Growing out of this there has been set up a Coffee Exchange, started in 1939, which sells domestic and foreign coffee quotas at public auction. A few months ago plans were drawn up whereby the government is to finance the marketing of coffee in the United States and Canada. Advance loans will be made by the National Bank of Costa Rica to coffee exporters, so that they may buy the crops of small farmers.

Costa Rica was the first country in Central America to produce bananas for export. The United Fruit Co., both as owner of large plantations and as buyer for most of the country's banana crop, has been a dominating force in the industry. Practically all Costa Rican bananas find their way to the United States. Originally

most production took place on the Atlantic coast, in a section comprising about 2,800 square miles. But the attacks of Panama disease and sigatoka, two devastating banana maladies, have taken their toll. Some of the former banana lands are being turned over to the production of cacao.

Here is an industry that has grown by leaps and bounds. It is estimated that about 74,000 acres of cacao are under cultivation. This is almost twice as much as in 1922. Yet this represents only a small percentage of the possible development of cacao production. Some experts believe that more than 350,000 acres could be devoted to this crop, under excellent conditions. Costa Rica is notably free from the witch-broom and cocoa beetle diseases. Even now between 10 and 11 million pounds of cacao beans are sent from Costa Rica to the United States annually. While this does not represent an amount rivaling coffee or bananas in importance, it does contribute substantially to Costa Rica's foreign trade.

Wide Expansion Possible

The agricultural wealth of Costa Rica is by no means limited to the outstanding products mentioned. The country produces a variety of crops and could grow still more, with adequate development. Sugarcane, corn, and rice, for example, now grow in Costa Rica but not in large enough quantities to satisfy the needs of the country.

Much is being done to improve this situation. The National Society of Agriculture interests itself in securing the best grades of seeds and distributing them to the farmers. It also promotes the use of fertilizers and modern agricultural methods.

Particular interest is being shown in the development of the so-called "tierra incognita." This is a potentially rich region, roughly triangular in form, bounded by the volcanic Cordillera, Lake Nicaragua, and the San Juan River.

(Concluded on Page 10)

Costa Rica . . .



All photos from Costa Rican Tourist Commission.

Milk goes into the hinterlands by horseback.

Coffee is the principal crop (left, below).



Youth looks ahead to promising new crops (right, below).



. . . Land of Promise



The whole family helps in their pottery business.

Owners are proud of their oxen and even decorate the carts.



It represents one-third of the country. Celebrated naturalists have compared this region to the Amazon. It is hoped that here will be developed the diversified agriculture which should liberate Costa Rica from the evils of one-crop economy. One of the projects now receiving considerable attention is rubber cultivation. It is probable that an experiment station for rubber research will be located on land to be furnished by the Costa Rican Government.

Considerable educational work is also being accomplished at the Centro Nacional de Agricultura, located in San Pedro Montes de Oca, a suburb of San José, the capital.

During September and October of 1940 a party of experts from the United States Department of Agriculture visited the north-coast region of Costa Rica to study the possibilities for rubber cultivation there. They were impressed with the San Carlos-San Juan region as embracing extensive areas suitable for the successful cultivation of rubber and will publish their findings in a report.

Significant indeed was the cooperative nature of the survey. The Costa Rican Government supplied two agronomists to accompany and work with the survey party. It also bore part of the expenses. The United Fruit Co. assisted materially in this joint effort of investigating the possibilities of utilizing considerable areas of abandoned banana land for rubber cultivation. Since the Government of Costa Rica has settled many colonists on some of these lands, the establishment of a small-grower rubber industry would aid in furnishing them with the necessary cash income to supplement their subsistence crops.

Costa Rica also is one of the countries mentioned as offering excellent conditions for the establishment of an institute of tropical agriculture. Such a center of experimentation and instruction would be invaluable in promoting the growth of many products which the United States needs but which must now be obtained

from sources outside the American Hemisphere.

One of the most important steps toward agricultural development in Costa Rica last year was the establishment, by Presidential decree, of the National Council of Agriculture. The purpose of the new organization is to coordinate all agricultural activities within the country and to fit them into a consistent program for the betterment of all concerned. It will approve the program carried on by the Department of Agriculture and the National Agricultural School.

Until last summer there was no university in Costa Rica, although the country has always prided itself, and rightly, on its educational efforts. The National University of Costa Rica was established by law and, for the present, it will consist of colleges of agriculture, law, pharmacy, pedagogy, and art. Later, as finances permit, it is planned to add colleges of engineering, sciences, liberal arts, dentistry, and medicine.

This captivating country and its democracy-loving people seem destined to make definite contributions to the long-time programs which will lead the way to cooperative living in the Americas.



LATIN AMERICAN STUDENTS IN UNITED STATES

Otto Lyra Schrader, a graduate of the Superior School of Agriculture and Veterinary Science at Vicosa, Minas Geraes, Brazil, and an inspector for the Brazilian Ministry of Agriculture, is one of a group of 18 Latin American students and professors who are studying in the United States as the result of scholarships and travel grants arranged through the State Department. This is a part of the program to increase interchange of students and teachers between the American Republics.

Mr. Schrader is continuing his agricultural studies at the University of Florida. The others are studying in various fields.

Rubber Grows Up

by EDGAR R. BURKLAND

NO ONE in Europe ever smoked a pipe of tobacco, sipped a cup of cocoa, enjoyed a plate of corn, tomatoes, and potatoes, or rode in the luxury of rubber-tired carriages until Columbus found the New World. These things were unknown to the people of Europe until after the discovery of America.

Of all the plants which the New World has contributed to the menu of man's enjoyments and the relief of his troubles, it is difficult to displace the rubber tree, *Hevea brasiliensis*, from a position near the top. Because it is by far the most important source of rubber latex, this tree, a native of Brazil, seems destined for a niche in the agricultural Hall of Fame.

In the first article of this series on rubber we discussed the vital part rubber plays in the national economies of the Americas; the position it occupies in the list of strategic materials necessary during war-time or times when war threatens; and the practicality of reestablishing the rubber-growing industry in the Western Hemisphere from whence it sprang.

Four hundred and fifty years ago, when the first Spanish Conquistadores elanked through the forests of the New World and scared the inhabitants out of their wits, the Indians of the Western Hemisphere had put rubber to practical use. They played games with rubber balls. They had makeshift rubber raincoats. They waterproofed canteens and battleshields with rubber for tribal warfare.

What the Indians had started the invaders failed to take up immediately. For 250 years, in fact, rubber remained in the curiosity stage. It was not until the twentieth century that it began to play a really important role in the economies of nations.

A few scientists in France, Spain, and Portugal, and two or three Englishmen, including Joseph Priestly and Samuel Peal, had pried into the possibilities of rubber before the end of the eighteenth century. But definite progress came slowly.

Among those who made important early contributions to the science of rubber were Michael Faraday, who first determined the chemical composition of rubber (1826); Nadier, another Englishman, who started the idea of rubber thread by cutting thin strips from long slabs of rubber (1820); Charles McIntosh, a Scotsman, who obtained a patent for the first practical method of waterproofing fabrics (1823); and Thomas Hancock, who enjoyed considerable success in the manufacture of a line of rubber goods.

Anyone who knows rubber utilization today realizes that there has to be a combination, at high temperature, of crude rubber and sulfur before useful products can be manufactured from the material. After years of experimentation, this fact was accidentally discovered by Charles Goodyear, an American, in 1839. Recognized as one of the most important contributions to science, this discovery definitely established rubber as of commercial importance.

Another name which stands out in the early history of rubber manufacturing is that of Benjamin Franklin Goodrich. In 1870 he established a factory for the manufacturing of rubber goods at Akron, Ohio.

Before the days of vulcanization and for some time after, Para, at the mouth of the Amazon River in Brazil, was an important source of manufactured rubber goods. The scattered rubber trees near the city gave birth to a

handicraft industry. The natives slashed the trees with knives and machetes and collected the latex in cups, pails, and clay molded onto the trunks. Camps were built nearby for smoking and coagulating latex and the manufacturing of crude articles of various kinds.

Rubber boots and shoes formed the principal export item from Brazil to the United States. In 1826, eight tons valued at \$3,458 were exported, and by 1855 this item had increased to 2,464 tons, valued at \$1,660,141.

For many years the Amazon Valley continued to be the chief source of rubber. At first commercial quantities were derived from a species of *Castilla*, but later it was found that larger amounts could be obtained from the indigenous *Hevea*. In the latter part of the nineteenth century Central America and Equatorial Africa, with different types of rubber trees, became important sources. From 1907 to 1912, guayule rubber, taken from a shrub in Mexico, contributed about 7 percent of the world supply.

During the last quarter of the nineteenth century the scene of rubber production began to shift to southeastern Asia. In 1876, the English, always with a wily eye for useful raw materials, succeeded, through the efforts of Henry Wickham and others, in gathering a few hundred pounds of rubber seeds from the vicinity of the Tapajos River in the lower Amazon Valley and transporting them to London. It resulted in the beginnings of the plantation industry which was to outdistance hopelessly production of rubber from wild trees.

Of the 70,000 seeds carried to London only 4 percent germinated in the Kew Gardens. From these gardens 1,900 seedlings were sent to Ceylon and from there to Singapore and from Singapore to the State of Perak in Malaya.

The British had plenty of troubles. But they had decided upon the policy of establishing the industry and they established it. Demand for rubber was increasing rapidly in the United States (from imports of 4,586 tons in 1875 to

18,646 tons in 1895) and the industrial nations of Europe. The physical factors of soil, climate, and rainfall were favorable in many areas. An abundance of cheap labor was close at hand, and improved methods of tapping the trees were a decided advantage. A coffee blight toward the end of the century made many planters more receptive to rubber experimentation.

Restrictions Attempted

A highly necessary raw material, rubber was, at an early stage, subjected to attempts at restriction in order to control prices. Some efforts to hold up prices were made by Brazil before the 1914-18 war, but, with increasing supplies coming from the East, these failed to stem the tide of falling rubber prices. From 1912 on, production increased rapidly in the Orient and decreased in the Americas.

The first restriction attempts in the East came in 1918, sponsored by the Rubber Growers Association of London. A serious shipping shortage and a large stock accumulation sent prices down to an average of 60 cents per pound for the year. Planters were requested to limit production by 20 percent, and three-fourths of the members did. Production fell the following year by 35,000 tons.

The results of this voluntary restriction were, however, temporary. They were counteracted through the increased production of producers not bound by the agreement. The price fell to an average of 49 cents in 1919, to 36 cents in 1920, and still lower in 1921.

In view of the situation, a committee was appointed by Winston Churchill, then British Secretary of State for Colonies, in 1921, to make investigations and recommend action. The committee, consisting of nine members with Sir James Stevenson acting as chairman, made its report to Parliament the following year.

The restriction plan, known as the Stevenson Scheme, became effective in 1922, was applica-



Bureau of Plant Industry photo.

*Dr. E. C. Stakman, leader of the Rubber Survey Party to Peru, Ecuador, and Colombia, and Dr. R. D. Rands, both of the United States Department of Agriculture, inspect a seedling of *Hevea* which has been budded.*

ble to the growers in the Malay States, the Straits Settlements, and Ceylon, and remained in operation for 6 years. Under this plan a "standard production" for each rubber estate was set, based on allowance for production from new areas. A certain percentage of the total standard production was allocated for exportation in each quarter depending upon the average price of rubber during the preceding quarter.

A number of factors hampered the working of the Stevenson Scheme. In the first place, there was a large increase in the production of rubber in areas not bound by the plan. The Netherlands Indies' percentage of world production jumped from 26 percent in 1922 to 37 percent in 1928, the last year of the plan. Secondly, although the largest portion of rubber from southeastern Asia was coming from big estates

at that time, an increasing amount was coming from native garden holdings which required very little capital, enjoyed low taxes, and were a serious obstacle to production restriction. In 1929 rubber from this source represented 40 percent of the net world exports.

In the United States, during the years of the Stevenson Scheme, things were going counter to the British attempt at monopoly. Rubber was being reclaimed in much larger quantities. Roads were being improved, thus lengthening the life of tires and decreasing crude rubber consumption.

To develop independent sources of rubber the United States sent technical missions to tropical America, the Philippines, the Middle East, and Africa. Operations were started in Liberia and in the Amazon Valley by two large American

interests. Lands in southeastern Asia were acquired by American companies.

These factors prevented the maintenance of monopoly prices. The annual average price of crude rubber fell from 72.5 cents per pound in 1925 to 22.3 cents in 1928, when the Stevenson Scheme was abandoned. Total rubber production rose from 662,220 tons in 1928 to 862,180 tons in 1929.

Removal of rubber production restrictions had an immediate effect on prices. They dropped 21 cents per pound in 1 day. However, the market steadied and held fairly well during 1929 with an average price of 20.5 cents, but in 1930, in the wake of the world-wide depression, the price of rubber broke and by 1932 had hit a new all-time low of 2½ cents per pound.

As the price went down producers resorted to all possible means to cut production costs. The sharp cuts caused hardship on everyone. This set the stage for a more ambitious attempt at restriction than before.

In 1930 the consumption of rubber in the United States declined rapidly, stocks began to accumulate, alarm spread among the growers. All tapping on British and Dutch estates was stopped in May but the price slid farther and farther down. For 4 years the industry was allowed to seek its own course. Finally, in 1934, negotiations between the growers of rubber led to the International Rubber Regulation Agreement.

Its objectives were to regulate production and exports so as to reduce existing stocks to a more normal figure; to effect an orderly adjustment of supply and demand; to maintain prices at a fair level, and one which would be reasonably remunerative to "efficient" producers. In order to achieve these objectives, the agreement ordered that exportable amounts, except in the case of Siam and Indo-China, be fixed in terms of a percentage of basic quotas which increased yearly in correspondence with a hypothetical long-time increase in world consumption.

It placed restrictions on planting and on stocks to be kept in producing countries. A special tax was to be collected by the governments on exports, and this earmarked for research into new methods of rubber utilization. The plan was applicable to British Malaya, Netherlands Indies, Ceylon, British India, French Indo-China, North Borneo, Sarawak, and Siam. Special schemes were worked out for Siam and Indo-China.

Under the agreement, an International Regulation Committee was set up, the main function of which was to fix from time to time, the percentage of the quotas exportable from the various areas.

The 1934 agreement differed widely from the Stevenson Scheme. It was far more inclusive. The cost of rubber to consumers under this agreement has been less than under the Stevenson Scheme, and price fluctuations have been narrowed. Duration of the agreement was fixed at 4½ years, but at the end of that period it was extended through 1943.

Industry Grows Up

Thus the rubber industry has grown. From a bouncing-baby business in South America through a painful but educational adolescence in the East it has reached immense proportions.

Because of the strategic importance of rubber, it is vital to the United States and other American republics that an adequate supply be available at all times. The distance of the present sources of supply from this hemisphere is so great as to endanger that supply in time of war.

One solution to the problem stands out strongly—the rehabilitation of the rubber-growing industry in its original Latin American home. From a long-range point of view, the establishment of independent sources of crude rubber in the Western Hemisphere appears feasible, practicable, and economically sound. Benefits would accrue directly and indirectly to all of the American republics.

AGRICULTURAL FRONT

CUBAN AGRICULTURAL SURVEY

As a furtherance of its general program to cooperate with all of the Latin American nations for the betterment of agricultural production and marketing during these crucial times, the United States Department of Agriculture is now conducting, with the full assistance of the Cuban Government, a survey of Cuba's agricultural resources. The survey is being conducted in connection with the general program for assistance to Cuban agriculture, proposed by the Cuban Economic Mission to the United States in October 1940.

Members of the survey group include Garibaldi LaGuardia, agricultural economist of the Agricultural Adjustment Administration; William T. Shaddick, of the Farm Security Administration; Dr. Paul G. Minneman, Foreign Service officer on detail to the Department of Agriculture; H. F. Blaney, irrigation engineer of the Soil Conservation Service; and Dr. Wilson Popenoe, tropical agriculturist for the United Fruit Co., on detail to the Department of Agriculture.

Particular attention will be paid by the survey party to the development of irrigation works; the promotion of new crops for export to the United States or other parts of the Americas; and the planning of a system of rural rehabilitation.

AID FOR SUGAR GROWERS

The Sugar Board has been established by President Calderón Guardia, of Costa Rica, to help sugarcane growers and aid the industry. The Board fixes sugar-export quotas, governs relations between growers and refiners, and keeps a register of all products in which sugar is essential. During the 10 years that the law is set to remain in force there will be no export tax on sugar and no special national or municipal sugar taxes.

BOMBERS CARRY RUBBER SEEDS

The seriousness with which the United States is approaching the hemispheric agricultural production problems is indicated in the flight of three United States Army bombers of the B-18 type, on February 5, from Cristobal, C. Z., to Belém, Brazil, a distance of more than 2,500 miles, with 1½ tons of rubber seeds.

Since the seeds of the rubber tree germinate comparatively fast, it was necessary to utilize the Army planes in order to safeguard the seed which is to be used in experimental rubber planting carried on under the auspices of the Brazilian Government with the cooperation of the United States Department of Agriculture. The seeds were shipped from the Philippines.

NEW PRODUCTS FOR GUATEMALA

A number of new products, complementary to the agricultural production of the United States, are being investigated by the Government of Guatemala, and some have passed the tests of experimentation.

Among these is cinchona, the source of quinine, with which work has been carried on for some time. During the 1940 National Fair there was an exhibit showing details of the cultivation of cinchona and the preparation of quinine sulphate, with daily lectures and demonstrations by experts. During the past two years there have been exports of the bark of the variety of cinchona which is native to Guatemala. The quinine sulphate yield of this bark is low, but it is used commercially in metallurgical operations and shipments have been made for this purpose. During 1940 some 75,000 pounds were exported for this use.

One large coffee-producing firm is making plans to expand the cultivation and marketing

of *Derris elliptica*, an important insecticide. The Government also is said to have available for planting shoots of derris and instructions as to proper cultivation.

Other products with which the Government is experimenting and which look promising are paprika, valerian root, guaiac or guayacan gum, used in the lard industry.

IOWANS STUDY LATIN AMERICAN MUSIC

More than 85,000 women and girls of Iowa, who are members of United States Department of Agriculture home economics extension clubs and 4-H clubs, are studying Latin American music as one of their projects this year, according to the Extension Service Review. Boys clubs in the State arrange music programs for some of their meetings.

The project will culminate in a series of fiestas throughout the State, in which the club members will take part. They will also participate in the annual pageant at the convention of 4-H girls' clubs at the Iowa State College in June.

DOMINICAN REPUBLIC SURVEY

An intensive agricultural and financial survey of the Dominican Republic is under way. In charge of the agricultural section of the survey will be Atherton Lee, director of the United States Agricultural Experiment Station in Puerto Rico. The survey is being financed by the Falk Foundation of Pittsburgh, under the sponsorship of the Brookings Institution. The study will cover a period of approximately 6 months and will be directed by Dr. Dana G. Munro, of Princeton University.

NICARAGUAN STUDY UNDER WAY

Charles L. Luedtke, United States Agricultural Attaché in Panama is now in Nicaragua for the purpose of conducting a general agricultural and forestry survey in cooperation with the Nicaraguan Government. Mr. Luedtke has had wide experience in Latin America, having served for many years as agricultural attaché in Argentina. Recently, he has made important agricultural surveys in Colombia and Ecuador.

PAN AMERICAN CALENDAR

March 30–April 8.—At Lima, Peru, the Third General Assembly of the Pan American Institute of Geography and History.

April 14.—Pan American Day and 51st anniversary of founding of the Pan American Union; at Rio Piedras, Puerto Rico, an Inter-American Writers Conference.

May 14–20.—At Montevideo, Uruguay, the American Conference of Associations of Commerce and Production.

South America contains 13 percent of the world's surface but only 4 percent of the population.

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There are more than one million inhabitants in each of four cities in Latin America. They are Buenos Aires, Rio de Janeiro, São Paulo, and Mexico City.

Vol. I

John W. Thompson, Editor

No. 2

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Colón Eloy Alfaro—*Our Mutual Friend*

In an effort to get to know our Latin American friends better we have been glancing into the backgrounds of some of them—especially those who spend a great deal of time here in the United States. The results are interesting and in some cases a little overwhelming.

It isn't easy to round up the achievements of the popular Ambassador from Ecuador, Colón Eloy Alfaro. He is extremely modest about it all.

Señor Alfaro received his early education at private schools in Ecuador and at the Colegio Nacional Vicente Rocafuerte in Guayaquil. He graduated from West Point Military Academy. He attended cavalry school in Germany and while there was a Lieutenant in a Hussars Regiment of the German Army. Back in Ecuador he was attached to the First Cavalry Regiment of Yaguachi.

He was Captain and Minister's Adjutant in the office of the Ministry of War at Quito; later went to the Military Academy at Quito where he was Captain-Adjutant and professor.

He was assigned as military attaché to the Legation of Ecuador in London and then as military attaché to the Legation of Ecuador in Belgium. His next move was to Panama where he was first Consul General, later Chargé d'Affaires, and then Resident Minister.

He has since served his country as envoy to Mexico (twice), Panama, Nicaragua, Guatemala, El Salvador, Honduras, Costa Rica, Colombia (twice), the Dominican Republic, and the United States.

As Ecuador's representative he has served as delegate on 12 special missions. These include the role of delegate of the Ecuadorean Army to the coronation of King George V of England; delegate to the Inter-American Economic and Financial Advisory Committee in Washington; and delegate to the Emergency Committee for the Provisional Administration of European Colonies and Possessions in the Americas.

He has received decorations for his achievements from Ecuador, Bolivia, Chile, Colombia, Costa Rica, Cuba, Haiti, Mexico, Nicaragua, Panama, England, and the United States.

He has written two books, "Principios de Estrategia" and "Eloy Alfaro y el Derecho Publico de America." He is a 33d-degree Mason, a life member of the Shriners, an active member of the American Institute of International Law, and a member of the faculty of George Washington University.

There is little doubt that, if there were such things as diplomatic "report cards," our mutual friend, Colón Eloy Alfaro, would get an "A+" for experience.



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Agriculture IN THE *Americas*



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April 1941

OFFICE OF FOREIGN AGRICULTURAL RELATIONS
UNITED STATES DEPARTMENT OF AGRICULTURE

Pan American Cooperation In Agriculture

It is only within recent years that a constructive program of Pan American cooperation in the domain of agriculture has been developed. In fact, agriculture was the last of national activities to become the subject of inter-American cooperation. It found a very subordinate place in the agendas of the International Conferences of American States. It was not until the Sixth Conference held at Havana in 1928 that provision was made for the assembling at Washington of the First Inter-American Conference of Agriculture. The outstanding success of this conference led to the establishment at the Pan American Union of a Division of Agricultural Cooperation, which in the course of a few years has become one of the most important divisions of the Union.

The outstanding service that the Division of Agricultural Cooperation has been able to render to the citizens of our sister republics has been due in large measure to the constant and unfailing cooperation of the U. S. Department of Agriculture. The unrivaled facilities of the Department and its highly organized scientific equipment have been of the greatest assistance to the Pan American Union and have made it possible to meet the thousands of requests for information that are constantly pouring in from every section of the continent.

Within the last year agricultural cooperation in the Americas has taken on a new and added significance. The uncertainty with reference to the source of supply of raw materials essential to the national defense has led the United States to look to the countries of Latin America for such materials. It is an interesting and significant fact that many of the articles most needed, such as rubber and quinine, were formerly produced on a considerable scale in Latin America but were later transferred to the East Indies. The investigations conducted by the Department of Agriculture with reference to the production of these and other raw materials constitute a service of vital importance both to the United States and to the countries of Latin America. The cooperation thus extended by the Department of Agriculture to our neighbors to the south has been one of the greatest influences in the development of constructive Pan Americanism.

In the publication of "Agriculture in the Americas," the Department of Agriculture is adding another to the many significant services that it is rendering in fostering continental cooperation and solidarity.

DR. L. S. ROWE,

Director General of the Pan American Union

Rubber on the Rebound—*East to West*

by DR. E. W. BRANDES,

*Head Pathologist in Charge, Special Rubber Project,
Bureau of Plant Industry,
United States Department of Agriculture.*

DEVELOPMENT of the rubber plantation industry in the Western Hemisphere definitely is on the march. Six months' extensive surveys of equatorial America's potential rubber-producing areas have done much more than show that cultivated rubber can be produced there. By means of wide plant collection and assembling at strategic points, production actually has been started.

Previous articles in this series on rubber have discussed the vital part rubber plays in our national economy. They have reviewed the resettlement and taming of the wild rubber tree, *Hevea brasiliensis*, to a plantation tree in the Eastern Hemisphere far from its home in the Amazon Valley.

Now we are ready to look at some of the reasons for that resettlement and to show some of the underlying causes—causes which often have been obscured by superficial reasoning. We are ready to talk about rubber plantations in the Western Hemisphere.

In contrast to the dotting of the vast, thick, equatorial American jungle growth by solitary rubber trees, usually not more than one to the acre, the trees in their Far Eastern home stand rank upon rank, closely spaced for convenience in tapping and gathering the milky latex, as well as for other economies. The trees in the East, moreover, have been greatly improved by Dutch, English, and American plant breeders and some of them yield up to five-fold or more of the average amount of latex given by unselected jungle trees. These inefficiencies in production

explain why the primitive rubber industry of the Amazon, as practiced in the early decades of this century, is a thing of the past as a factor in the world's rubber supply. We shall see how an indigenous American plant disease played a large part in frustrating attempts to imitate the East in regimenting wild rubber trees and how that disease problem is being solved.

Alibi Versus Facts

The emigration of *Hevea brasiliensis* to new shores has been a favorite theme in rubber literature, referred to by many observers as misappropriation of the birthright of Amazonia. In particular, the so-called "seed snatch" of the English planter, Henry Wickham, in 1876 was detested by a few who, after the success of the plantation industry, gradually came to the conclusion that they had been dispossessed. Mr. Wickham was knighted by a grateful home government that considered its colonial interests benefited.

The fact is that Sir Henry himself, by his accounts of the stealthy manner of collecting and transporting the half-ton of seed, contributed much to the tradition of nefariousness in the business. The introduction of coffee and sugarcane into equatorial America is accepted without such implications.

Another fact, recognized by intelligent Latin Americans, is that if they had returned part of the rubber profits and taxes to the industry as a fund for research and had employed competent scientists as was done in the Orient, their rubber industry would not have escaped them or now stand in need of complete reconstitution. A third recognized fact is that loss of the rubber

markets is not irreparable. A part at least will be retrieved if they have the will to take full advantage of the leavening process now under way.

The excellent rubber surveys conducted in the Americas, Africa, and the Philippines in 1923-27 by the Bureau of Foreign and Domestic Commerce, Department of Commerce, and the Department of Agriculture, were inspired by American rubber pioneers, including Harvey Firestone, who viewed with apprehension the trend toward planter and government combinations for control of supplies and prices in the East. These farsighted men decided upon a declaration of independence. Corporate self-interest as well as protection of rubber consumers motivated that effort, which resulted in the launching of plantation rubber enterprises in Liberia on the west coast of Africa; on the Tapajos River in South America; in the Philippine Island of Mindanao; and later in Central America. Despite heartbreaking obstacles, always the portion of pioneers, the enterprises are on their feet. Some of the original proponents admittedly were a little mistrustful of the outlook but now the chances for vindication of their judgment are increasingly better.

Late in 1939 the present war brought to the fore another danger long recognized by prudent students of tropical agriculture in relation to the national economy. This is the precariousness of remote rubber sources in times of great disturbances of international amity. The President and Vice President (then Secretary of Agriculture), and the Under Secretary of State took personal cognizance of the problem and an item was included in the second deficiency bill providing a half million dollars "to enable the Secretary of Agriculture to conduct investigations directed toward the development of rubber production in the Western Hemisphere, including production, breeding, and disease research; surveys of potential rubber-producing areas; establishment and operation of experiment and demonstration stations in suitable locations; ac-

quisition of land for such purposes; construction of necessary buildings . . ." The bill was passed by Congress, June 22, 1940, and the money was available in July.

As a matter affecting national preparedness and defense, the question of shaping such a research project had been given appropriate attention by employees of the Bureau of Plant Industry during consideration of the bill by Congress. Therefore, on the basis of the amount appropriated and other current considerations, as well as considerations long in mind, it was possible to complete a plan in the first days of July covering a 3-year program of action. The plan was approved by the Chief of the Bureau of Plant Industry and the Director of the Office of Foreign Agricultural Relations and was put into effect the same day the appropriation was authorized.

How It Was Done

It may be well, here, to touch upon the preparations indispensable to effective and coordinated field work in the areas of the Western Hemisphere that were recognized as presumptive locations for plantation rubber enterprises. For the most part, these areas are little known even to the nationals of the countries involved. The stupendous areas comprising the thinly populated "out-back" parts of the tropical countries mean necessarily that modern roads are still lacking. To reach them meant extra-hazardous travel over mountains, travel up rivers, and travel through steaming lowlands. A glance at the map will show the great distances traversed between areas and an indication of means used to get about the great expanses within the areas (see pp. 8 and 9). Fundamental in the project was the rapid setting up of programs of cooperative effort by mixed commissions in each of 15 countries. That all of these complex international programs could be arranged by cablegrams in July is a clear indication of the recognition accorded the project

by the Latin American countries and presages well for its ultimate accomplishments.

Simultaneously, the United States Department of Agriculture personnel which was to work with collaborators in the countries visited was appointed and assembled in Washington, some of the specialists dropping their work in foreign countries to answer the call. The party leaders and party members included many whose scientific work had contributed definitely to the steps which had transformed rubber from the primitive tapping of jungle trees to the modern plantation industry of today and, with one exception, are natives of the United States who go places and do things. For reasons including the firm conviction that the job was appropriate from the standpoints of realism, patriotism, and justice, they were willing to leave positions of responsibility or to emerge from well-deserved retirement to lend a hand. Similarly, it was possible to enlist the energetic cooperation of able, patriotic men in the Latin American countries. The parties were equipped and instructed, and ready to depart to wide-flung fronts by the end of July. This involved purchase and packing of scientific, medical, and camping equipment, prophylactic treatments for typhoid and yellow fevers, smallpox, etc., issuance of passports, travel reservations, etc., items easy to record but bristling with details to crowd the day and night hours of the administrators.

Although removed from the theaters of intense warfare, some account had to be taken of the impact of war on communications in shipping plant materials half around the world and in transporting men and materials in the Western Hemisphere, to say nothing of the need for alertness to guard against possible machinations of unfriendly interests. The precautions taken have been well justified by events. Transportation conditions made it necessary to approach almost every job of moving men and materials by providing a choice of several alternative

means or routes. Poor or interrupted services mean only delay in the case of men but the annulment of sailings or requisitioning of ships through military necessity is fatal to shipments of perishable plant material and unhappily some shipments have been injured or lost despite all reasonable precautions. The precautions taken have included personal escort of plant material to expedite rerouting and, by courtesy of the Army, the actual transporting of bulky shipments by military airplanes has been utilized as will be noted in the photographic illustrations (see p. 5).

The field work of collecting plant material and essential data is well advanced, thanks to realistic planning, the generous cooperation of government agencies in the interested countries and a measure of luck. Aside from bouts with malaria and dysentery and painful but not serious injuries, no casualties have marred the record of the project.

High Yield Is Key

The cultivated *Hevea* is preeminently the most important species for rubber production. It is strictly a plant of the deep tropics and conditions suitable for economic production are not found departing from the Equator much more than 15 or 16 degrees of latitude. The keystone of success in crude rubber production is of course high yield, and yields of latex from *Hevea brasiliensis* individuals are variable. Probably the finding and segregation of high-yielding individual trees are the outstanding contribution of the Eastern Industry to the whole problem. In the Orient, advantage was taken of this variability in selecting and crossing individuals for increased yields.

In contrast with products like sugar in which the spread of actual production costs is often measured in fractions of a cent per pound, and accessory benefits may amply justify production in our own country in spite of higher labor costs and taxation, the range of rubber production

costs is wide. The differential in cost may range from less than 5 cents per pound for Para rubber to 75 cents for some types of synthetic rubber. For specialty purposes premium prices are justified for certain types of synthetic rubber. As yet no temperate zone rubber-producing plant has appeared on the horizon that seems to offer promise of approaching Hevea as a low-cost source of rubber, although many promising plants are under investigation.

Guayule rubber can be produced in the West and Southwest and presents a definite recourse in times of emergency such as the present. Outstanding improvement of the plant and field production practices as well as fabrication methods have taken place in recent years. Other plants, including goldenrod, have been improved in percentage of rubber produced.

Up to the present, the same may be said of processes for converting other crude materials into rubber. The cost of such synthetic rubber materials may and doubtless will be lowered to approach in some measure natural rubber costs, but the same sort of efficiencies for natural latex rubber may be expected as research proceeds. The rubber plantation industry is relatively young and great opportunities exist for making it more efficient by mechanization and further improvement of acre yields. For these very cogent reasons, and with full assent of all who can speak authoritatively for the rubber industry, it was decided to emphasize in the present project the Para rubber trees and, within the geographic limits of its range, to capitalize in the new developments in the Western Hemisphere upon the demonstrated variability of Hevea. It is true that with the fixed geographic limitations the plantation profits anticipated will largely accrue to workers of other countries, as they do now. But it is also true, and I would emphasize the importance of this economic factor, that Western Hemisphere rubber will enable our neighbors to the south to purchase our goods in greater quantity. Moreover, it is a sheet to windward for the consumer of rubber in the United States, giving added protection against

price fixing or any undue rise in price and greater assurance of uninterrupted supplies.

These considerations, then, prompted the decision to assemble all available high-yielding clones of Hevea for rapid multiplication of budwood at central propagating stations in Honduras and Haiti and to establish seedling nurseries in all cooperating countries for reception of the budwood beginning at the end of the first growing season. The high-yielding clones were obtained in the form of budded stumps produced on modern plantations in various parts of the world.

Several rubber planting companies, including preeminently the Goodyear Rubber Plantations Co. operating in the Philippines and Central America, have cooperated in providing technical advice, rubber-sheeting machines for small growers, and invaluable budwood and clonal seed used in this project.

Fortunately, seedlings were ready for budding on receipt of the initial order for particular clones, the budding was accomplished, stumps were lifted, packed and shipped, and the first large order arrived in Honduras in November 1940. The boat carrying this shipment was commandeered at a west coast port but, after some delay, the trees arrived at their destination in fair condition and 60 percent of them now are vigorously growing at the propagation station. Other orders quickly followed, and the stream of this material is rapidly increasing.

The ultimate distribution points, from which the commercial plantations are expected to radiate, are the local nurseries and demonstration stations situated in the cooperating countries (see pp. 8 and 9). It was necessary to make careful choice of locations, acquire and prepare land, provide seed, and launch these enterprises concurrently with the acquisition of budded stumps because seedlings at least a year old must be available to receive buds from the superior clones when the latter are ready for distribution. Due to the staggered seed seasons in different latitudes and the prospective loss of time in some

(Continued on page 6)

Army Bombers Lend a Hand . . .



U. S. Army Signal Corps photo.

Above are shown three of the B-18 type, U. S. Army bombers. A flight of three of these planes delivered $1\frac{1}{2}$ tons of Philippine rubber seeds from Panama to Belém, Brazil, February 5. Cooperation of the Army was necessary since, because of delay in shipping facilities, there was danger that the seeds might germinate before they could reach Belém by boat.



Bureau of Plant Industry photos

Rubber seeds, not bombs, go into the "bomb bay" of one of Uncle Sam's warplanes at Panama, previous to the flight.

The rubber seeds, in bags (left) awaiting the air ride to Brazil.

cases if the seed crop of the country was waited for, arrangements were made to interchange seed and get the plow in the ground at the earliest moment. For example, seed was shipped by air express from Haiti to Brazil and planted 2½ months in advance of the seed season in the latter place and later a return shipment of seed from Brazil supplemented the nursery stock in Haiti. Nursery propagation stations have been established in 12 countries, from Brazil and Peru to Guatemala and Mexico. Nearly a million seedling trees are growing and, as with the nurseries of budwood, the actual numbers of seedlings are rapidly increasing. All of the tree and seed introductions and exchanges had to be handled with meticulous care to avoid spreading plant diseases and insect pests.

One of the great hazards of the plantation industry in America is a fungus leaf disease peculiar to and coextensive with native *Hevea* in the Western World. In its native environment, in mixed stands in the forest, *Hevea* is only lightly attacked by this indigenous malady but when closely spaced in nurseries or plantations epidemic conditions are set up and mass defoliation frequently takes place, often resulting in the death of the trees. It was this disease that discouraged the development of *Hevea* plantations in America when plantations were rapidly expanding in the Orient where the American disease has not even yet followed its natural host. This disease may have been responsible for the tradition, deeply entrenched in the minds of the seringuieros of Amazonia, that it is quite impossible to cultivate *Hevea*. The variability of *Hevea* previously mentioned, fortunately, is expressed in the differential responses of individual trees to this disease. That means, of course, that trees may be selected or bred for intensification of resistance to leaf blight as well as for higher yield or other objectives. Since the disease will inevitably follow the host plant to the East, where it has not been taken into account in breeding, the plantations there are fair prey for it. That may result in an unexpected advantage

for Western Hemisphere *Hevea* plantings, which necessarily must be developed with due regard of the danger from leaf blight.

Neglect of research on the disease problems by the interested countries in the New World, as much as any factor, may be charged with the loss of the once important, lucrative rubber industry. The disease does not present any problem, new or strange, to competent biologists accustomed to confronting similar problems in other crops. In attacking this particular disease problem there are not less than five strings to the bow: (1) Use tolerant *Hevea* strains now available; (2) test and select or breed more resistant ones; (3) plant in the still disease-free areas, where there is likely to be a lag in encroachment of the disease; (4) plant in environments where the natural conditions are unfavorable for epidemics (see note) ; and (5) use direct control measures, as dusts and sprays, especially in nurseries where the juvenile plants are most susceptible to injury. In this disease investigation there is no working in the dark. The scientist is not frightened by any aspect of this disease and there is no cause for undue alarm for the planter. The problem resolves itself into just another job of scientific agriculture.

NOTE.—Conditions unfavorable for epidemics are found in many situations where rainfall is somewhat deficient but can be supplemented cheaply with irrigation water. This strategy has been successfully used in control of diseases similar to leaf blight in the case of other crops. Latex flow under irrigation is being observed experimentally. In other situations where rainfall is adequate the force and direction of winds and their effect on morning dew appear to influence the severity of leaf blight.

In addition to the functions of assembling the best high-yielding and the best disease-resistant clones or strains of *Hevea*, multiplying and distributing them to the nursery-demonstration stations for further increase and redistribution, an important part of the rubber project is original biological research. At present there are three headquarters for this fact-finding work (see pp. 8 and 9) which includes pathological

studies actively in progress, and breeding, plantation practices, including crops suitable for interplantings, for which land preparations and housing are nearly completed. Some physiological studies are in progress under controlled conditions at Arlington Farm near Washington. The scope of research work will increase during the next 6 months when field laboratories and other facilities are operating smoothly and the employees are relieved of construction and "opening up" of jungle lands.

Part of the work of the survey parties is closely integrated with the biological research. In the countries visited by the parties, collections of *Hevea* seed and of budwood were made where possible and divided for planting within the country and shipment to the central research stations. The criteria used in making collections were the evidences of superiority in various desired characteristics. This plant material is not of immediate usefulness but is wanted for study and testing with the ultimate view of combining any valuable qualities with those of present commercial clones by breeding. A considerable investment of time and money will be required for work of such long duration.

The survey parties sent miscellaneous biological specimens (diseases of *Hevea* and related plants, insect pests, soils, etc.) for examination and study at the various permanent headquarters. Other features of the work of survey parties were setting up of cooperations for future joint effort and examination of lands for nurseries and suitability for commercial development. Lands that in the judgment of party leaders warranted intensive study were not only examined for evidence of natural adaptation to the purpose of plantation rubber production; a wide variety of essential agricultural and economic information was also gathered. This ranged from land tenure, special tropical crops, wharfage fees at the nearest seaport, health conditions, and wage rates of the population to practical questions involved in the relations of the sponsoring departmental and federal gov-

ernments, all recorded in a specially devised 30-page questionnaire, with sketch maps. Maps made in the field were roughly related to office base maps by land survey methods or by such methods as could be devised, for relocation of points of interest. Thousands of photographs were made and filed, including color transparencies and motion pictures. In the surveys, much use was made of air transport, which totaled hundreds of passenger hours and saved valuable time.

Purpose Of Survey

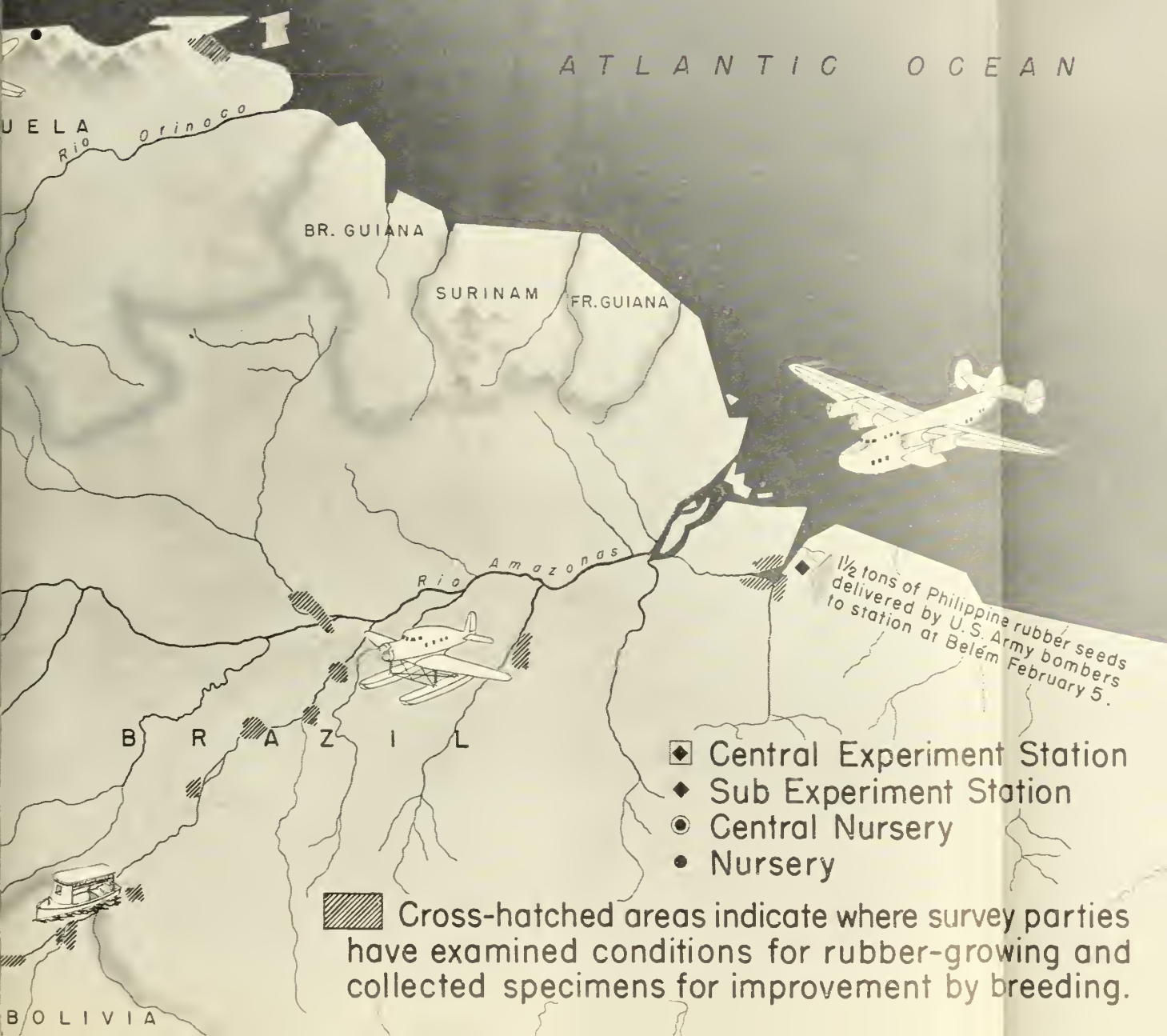
The surveys completed in March brought to a close one of the features of the project to stimulate the development of Western Hemisphere rubber production. The purposes of that feature were primarily to collect valuable plant material, start nurseries, and determine where and if plantation rubber can be produced, supplementing the work of previous surveys, to get essential detailed information on areas selected as suitable for plantations. It was a foregone conclusion that the tree will grow well where nature put it and that with consistent and maintained agricultural research in those sections most suited to rubber production, the purely agronomic and plant-disease problems that come with cultivation can be solved. The purpose of the surveys was not to discover that plantation rubber production in this hemisphere can be successful, but to start the job in a material way with full recognition of the major problems involved. The mandate in the legislation was that the work should be directed toward the development of rubber production. The establishment of nurseries in cooperation with agencies of the Latin American governments to increase the superior plants, which are keystones of plantation rubber production, for distribution by those governments to their rubber producers is not only compliance with the letter and spirit of the legislation but a forward step which has been taken without loss of time.

(Continued on page 10)



By plane, automobile, river gunboat, launch, canoe, muleback and "Shanks' mare", five parties of United States and Latin American scientists have surveyed many of the remote potential rubber areas of this hemisphere in six months.

Potential Rubber Areas of Equatorial America



GULF OF MEXICO

CUBA

Potential Rubber Areas of Equatorial America

CARIBBEAN SEA

ATLANTIC OCEAN

PACIFIC OCEAN

plane, automobile, launch, muleback and "s'mare", five parties from the United States and Latin American scientists have surveyed many of the potential rubber areas of this hemisphere in six months.



1 1/2 tons of Philippine rubber seeds delivered by U.S. Army bombers to station of Belém February 5.

- ◆ Central Experiment Station
- ◼ Sub Experiment Station
- Central Nursery
- Nursery

■ Cross-hatched areas indicate where survey parties have examined conditions for rubber-growing and collected specimens for improvement by breeding.

From the example of the plantation rubber industries of the East, a lesson should be learned as to the mutually beneficial interrelation of large plantations and small groves, the so-called "native production." It is recognized that the small grower, unfamiliar with the complicated practices, is not likely to start planting rubber trees or, if he does, is not likely to be successful unless there are adequately financed, well-managed estates from which he can acquire by precept and example the necessary skills in the conduct of his own enterprise. It is certain that the rapid development of rubber production in the Western Hemisphere can best be promoted if a similar balance of large and small plantings is realized but with initial experimental plantings by the interested corporations. Several plantations already in operation serve the purpose in a limited way but further "inoculation" of the choice areas considered to have immediately usable facilities and prospects (roads, available labor, etc.) is much desired. We cannot overemphasize the practical importance of such pioneering by Latin American or other companies. Plantation companies not now engaged in rubber production in equatorial America have expressed interest in the prospects and some have already interviewed employees of the government project preparatory to sending their representatives to the indicated areas for first-hand examinations.

The educational value of scattered plantation enterprises will, of course, need to be supplemented by extension activity by the local government in order to bring about rapid expansion of a native industry.

The relative opportunities that the present situation offers to the several countries of equatorial America depend upon a number of factors. Important among them are the extent and location of areas suitable for plantations, the urgency of the need for replacement crops or new development, the facility of transportation to ports and markets, the attractiveness of prospects for private investment in company enter-

prises of appropriate size, and the sustained, active interest of the local governments in stimulating family-size plantations by extension work, demonstrations, and other aids.

Paving The Way

Material for circulars and the daily press on disinfecting, handling, and germinating seed, planting in nursery beds, transplanting, budding, etc., has been prepared and distributed to cooperating government agencies. Through the generosity of a large rubber company a dozen rubber-sheeting machines similar to those used on family-size plantations in the East Indies have already been delivered in Para. Using latex from wild trees, the method of preparing No. 1 smoked sheet, which commands the highest price on the New York market, has been demonstrated by our employees at large "field day" gatherings of seringuiros and officials. This represents a forward step in modernization of the industry that can be adopted as soon as the inexpensive machines can be manufactured and distributed locally. Drawings of the sheeting apparatus, something like the familiar wash-day mangle or wringer, have been submitted to local machine shops for duplication. Designs for simple home-made smoke houses are available. The transition to the modern from methods that are a heritage from the aborigines and depart little from them even now will be contested by some of the "patrones," the small group of rubber buyers who finance the rubber gatherers, and in time-honored fashion keep them in virtual peonage by that device. Changing of such outworn systems which long have retarded progress is one of the pledges of the forward-looking Chief of State of the largest country in Amazonia. In two other countries sufficient interest has been aroused to inspire appropriations for launching of agricultural research institutes giving chief attention to modern rubber production methods. These institutes are in addition to the cooperative research

centers indicated as part of the program in the accompanying map but similarly they have invited joint effort in the provision of plant material and in working out problems by consultation. Some of the research will necessarily be on a permanent basis, either in cooperation with Latin American governments, companies, planters' organizations, or supported wholly by the latter.

Implemented by Congressional authority and the necessary funds, plus the managing ability of experienced and willing party leaders and other personnel, much progress has been made in 6 months. Tribute is due to the cooperating governments of foreign countries for generous support and assignment of able technologists for various tasks and to a host of cooperators in the United States State and War Departments. The provision of funds to carry out well-considered plans has made it possible to do more than pass a sterile resolution, unhappily the end point of many good ideas.

There should be no lack of frankness in discussing the facts and the prospects for Western Hemisphere rubber production, to which we are committed, because of world events, as a matter of national policy. It takes 2 years to plant seeds, grow nursery seedlings, bud and transplant in place or by any other technique: it requires an equivalent time to start plantations, and 5 years more before tapping may commence. Nothing can accelerate the normal pace of nature. Considering these time-consuming operations let's view this development by projecting ourselves in fancy 6 years from now and look in retrospect at the intervening years.

It is A. D. 1947. What has been accomplished for ourselves and our neighbors? The United States of America is still by far the largest consumer of rubber. Consumption has greatly increased as compared with 1940. We had no direct interest in rubber supplies for the rest of the world but we were entitled to consideration on the question of whether or not our own supplies were secure and reasonably priced.

We preferred that our own increased needs did not come from some remote "sphere of influence" no matter who controlled it but were content with building up honest trade with friendly next-door neighbors. With our increased consumption we now use enough rubber to insure profitable business for not one but several of our neighbors to the south. The agronomic problems were met and did not deny us the right to continue building for increased trade to exchange manufactured and other goods for crude rubber. The eventualities of the intervening years included: (a) The war interrupted the flow of rubber from the East, in which case we were no worse off because of stimulating rubber production in the Western Hemisphere; or, (b) the war did not interrupt the flow. In the latter case, increased consumption still permitted us to take considerable rubber from the East. The latex continued to well up in the trees and the owners of the eastern plantations were glad to sell it. During the 7 years the fretful caws of "raincrows" were heard. Raincrows are useful birds if they don't bring farmers' operations to a permanent halt, so they were heard with resignation and, in fact, with some relief when it was realized that they did not know the half of the problems. The transition from chief dependence on the Eastern to the Western Hemisphere sources of potential rubber supply went on gradually during the years in spite of the problems and the prophets, and thanks to the growing needs, without any particular harm to any vested interests.

These projections are, of course, just that—projections. However, they are based on scientific and economic experience. They are what is expected to happen and, with a continuance of the excellent cooperation so far received, they are what will happen.

In these days of swift-moving international events and some bewildered thinking, the rubber project stands out as a refreshing example of quick translation of an idea into reality and a rapid march to an objective.



Morro Castle at the entrance to Habana harbor.

Wendell P. Colton Co. photo

by PHILIP LEONARD GREEN

"NOWHERE . . . do those North and South Poles of character and outlook on life . . . get so close to each other . . . and rub each other so little the wrong way." Thus writes T. R. Ybarra about Cuba in his book, "America South."

Geography, of course, has much to do with this. Cubans feel a nearness to the United States despite the fact that they have no common land boundary with this country.

Cubans send their sons and daughters in ever-increasing numbers to study in the United States. These young people naturally return to their native land personally acquainted with and enthused about the ways of life here.

Cuba's unique geographic position has made

her extremely important in other ways, too. The present crisis, calling for far-flung plans of hemispheric defense, has served to accentuate this importance. Even in times of peace, Cuba—which, incidentally, is much larger than many suppose—lies athwart well-traveled trade routes between the Caribbean area and the Old World. In war times, these same routes could be utilized as entering-wedges by an enemy. The vital Panama Canal is only 720 miles from Cuba's southernmost point. An enemy force, once past Cuba, would have relatively little difficulty in making its way to that strategic artery. Should it succeed in crippling the canal's operation, upon which depends the effective maneuvering of the United States Navy from one ocean

to the other, one does not need to go into details about the possible consequences.

It is essential therefore that the defenses of this all-important Caribbean outpost be well assured: and the strongest pillar of such assurance is the continuing devotion of Cuba's people to the spirit of freedom.

Fortunately, the people of Cuba have an unquenchable love for liberty. They have come by this quite naturally. A long-drawn-out struggle for independence conditioned them to appreciate fully the blessings of freedom.

Cuba and Puerto Rico for many years constituted Spain's last foothold in what was once a vast American empire. The superiority of Spanish forces on the island prevented Cubans from striking for their independence at the same time as did Spain's Central and South American colonies. This fact, together with the bloody nature of the repeated attempts at independence, in which they engaged despite these odds, imbued the people of Cuba with a fiery devotion to the ideal of liberty, such as can be experienced only by those who have really sacrificed for it. Then, too, their experience with the alternative of foreign domination has been too recent in their history to have permitted them to become unappreciative of the blessings conferred by independence, despite its many shortcomings.

Yet, the Cubans are basically a mild-mannered people. The wholesale infiltration of immigrants from Africa in the early days, gave to much of Cuban music, literature, and ways of life a distinctive "Afro-Cuban" quality. The people of Cuba are noted for their ability to see the lighter side of life. But this does not mean that they can be imposed upon, for they are unusually quick to sense any such attempt.

There is one important factor to remember in this connection. Many Cuban families, it is true, trace their ancestry back to early conquistadores, or settlers, often of aristocratic background and coming largely from romantic Andalusia, in southern Spain. But much of the vigorous quality of Cuban life can be traced to

the later Spanish immigrants. A goodly number of these hailed from the northern regions of Spain and were noted for their industry and thrift. Often coming with hardly a *peseta* to their name, they quickly accumulated enough money to become proprietors of thriving business enterprises. They arrived in such large numbers that their influence on the outlook and life of the nation has been unmistakable. Today the "Centro Asturiano" and the "Centro Gallego" (two sumptuous clubs founded, respectively, by and for natives of the Spanish provinces of Asturias and Galicia) are models of cooperative benevolent associations. For a modest monthly fee they provide medical and other services to their thousands of members, which would ordinarily be available only to people of means.

Sugar made Cuba known the world over, and the United States buys most of it.

During the latter years of World War I and immediately following it, Cuba had a sugar boom—the famous "Dance of the Millions." In the suburbs of Habana, magnificent palaces began to be reared. Some of them were never finished. When sugar prices tobogganed, Cuban prosperity faded.

Cuba's One-Crop Economy

For Cuba was, as she still is, largely a single-crop country, though she does produce tobacco in the west, and tropical woods, such as mahogany, in the east. Her entire economy is so much tied up with sugar that when even a slight reduction in price or decrease in sales takes place practically every Cuban suffers. The present war, by shutting off sugar exports to much of Europe, has created a virtual crisis. By simply following the story of Cuba's sugar through the years, one can gain considerable insight, not only into her economic difficulties but also into her social and political problems.

Many Cuban leaders are awake to the weakness of such a single-crop economy. They have been urging a policy of diversified agriculture rather than one of waiting for sugar prices to

skyrocket again. By freeing their country from utter dependence on the whims of the international sugar market, they hope to place it on a firmer economic footing. They have shown a keen desire to try any remedy that seems reasonable.

Thus, late in January of this year, Cuba received a mission of five experts from the United States Department of Agriculture to help in a joint survey of Cuban agricultural resources. This is part of the general program for assistance to Cuban agriculture which was proposed in October 1940 by the Cuban economic mission to the United States.

Among the matters which will receive particular attention in this survey are the development of new products not competitive with those of the United States, rural rehabilitation, and irrigation.

Closely related to the diversification of agriculture is the building and maintenance of highways. There are now about 2,000 miles of improved roads on the Island. The Central Highway accounts for 700 miles of this. It cost over \$75,000,000 and extends from Guane, in the westernmost province, Pinar del Rio, to Santiago, in the easternmost province—Oriente. This artery has provided the stimulus for the building of short feeder roads by the provinces which it serves. Obviously, more and better roads will greatly increase the farmer's ability to get his products to the markets. They will also make more of Cuba easily accessible to the tourist.

Cuba is one place which the most colorful travel literature cannot overrate.

It seems hardly possible that there should exist at the doorstep of the United States a land which still combines so much Old World charm with its spirit of modern hustle and bustle.

First, there is exquisite Habana, the capital and main commercial center of the Republic. Though boasting a rich heritage of Spanish colonial architecture which is bound to delight

the eye, this city of 600,000 has every modern attraction that the visitor from the United States might desire: Wide avenues, a marvelous beach, an opera house, excellent hotels, clubs, and other centers of diversion.

Habana is not Cuba. Yet relatively few visitors from the United States ever get beyond it to see the picturesque scenery and visit the charming cities of the interior.

There is Santiago, for instance. It was Cuba's first capital city and still is the headquarters of its Archbishop. Here, set among towering hills, is a quaint town which still recalls to mind colonial times. Nearby is historic San Juan Hill.

Camaguey, in the center of the Island, is another interesting town which harks back to Spanish colonial times. Cienfuegos, on the south shore, is also well worth a visit. Sancti Spiritus abounds in colonial atmosphere. The Vuelta Abajo region, on the western end of the Island, is an excellent place to see some of the world's best tobacco grown.

Travel Works Both Ways

There are many other places, each with some peculiar attraction or characteristic. Most of them can be reached fairly easily by airplane, rail, motor, or boat.

Travel in Cuba by citizens of the United States is not only an enjoyable and instructive experience; it is also an excellent means for helping the Cubans obtain foreign exchange with which to pay for goods bought from the United States.

Despite Cuba's economic misfortunes, due principally to her dependence on one crop, she was our ninth best customer in 1939, according to "Exporter's Digest." Her total purchases from the United States in that year ran close to \$82,000,000 (more than any Latin American market except Mexico and Puerto Rico). Among the products she bought were automobiles and trucks, cotton and jute bags, foodstuffs, silk and rayon yarns, electrical appliances, office



Wendell P. Colton Co. photo

Cutting the sugarcane that has made Cuba the world's "Sugar Bowl"

equipment, agricultural machinery, paints, drugs, and chemicals.

That Cuba's importance is recognized by forces unfriendly to democracy is evidenced by the activities of the Falange (Spanish Phalanx).

Cuban authorities recently arrested Ramón Rodríguez Fernández, Spanish honorary vice consul at Mayari, in Oriente Province. He was charged with having in his possession receipt books and a list of Falange members in his district. This organization, though banned in Cuba during the Spanish Civil War, is said to have several thousand members there.

It has been urged in Cuba that a mutual defense treaty be signed with the United States.

Last September the Chamber of Representatives provided for 2 years' compulsory military

service for men between the ages of 18 and 35.

The matter of defense, of course, involves more than military preparedness. Realizing this, officials of the Cuban and United States Governments have bent every effort to tighten economic bonds between the two countries with the object of strengthening the position of this important outpost in the Caribbean.

BANANA EXPORTS INCREASE

During 1940 small landowners in the Dominican Republic exported 481,102 stems of bananas through Puerto Plata, in the north of the Republic. Of this number, 479,819 stems were shipped to the United States. This is a considerable increase over the quantity exported during 1939.

ALONG THE AGRICULTURAL FRONT

YOUTH CLUBS IN THE AMERICAS

Interest in the development of 4-H clubs throughout the American Spanish-speaking countries is increasing rapidly. Puerto Rico, with an enrollment of 7,200 boys and girls working in agricultural and home-making projects modeled after the 4-H clubs of the United States, is a good example of what can be done.

In 1939, the Venezuelan Minister of Agriculture went to Puerto Rico to make a study of the movement. As a result, the 5-V clubs of Venezuela were organized. In Cuba, clubs for rural young people are called the 5-C clubs, and are also modeled after those in the United States.

In forwarding information on 4-H clubs to Latin America, the Puerto Rican organization has issued bulletins in Spanish describing club activities. A short-wave broadcast in Spanish to Central and South American countries recently described the work of the 4-H clubs in the United States. Motion pictures depicting the activities of the clubs in Cuba and Puerto Rico soon will be available to interested Latin American countries.

AID TO FARMERS IN URUGUAY

As a result of two short wheat harvests and a forecast that the 1940-41 harvest will fall below domestic requirements, the government of Uruguay has passed legislation to aid farmers and prevent an increase in prices.

CUBA INTENSIFIES PROGRAM

Cuba and the United States are cooperating in a program to discover new sources for agricultural wealth in Cuba. Recently, the Cuban Minister of Agriculture, accompanied by a group of United States agricultural technicians, returned from a survey trip into the interior of Cuba. Since the trip, the Minister has announced the initiation of a program to introduce new crops, scientific intensification of the cultivation of present crops, and an extensive irrigation project to supply water to outlying districts.

Agricultural programs already progressing in Cuba include the development of the natural silk industry; the improvement of stock- and poultry-raising and bee culture; agricultural education for farm families; coordination of land-tenure and rentals; and a study of the benefits derived from the establishment of cooperatives.

HOW CINCHONA GOT ITS NAME

The medicinal value of cinchona bark, from which quinine is extracted, was revealed in 1630. In that year Señor Canizares, a Spanish magistrate, is said to have been cured of malaria by the use of cinchona. Eight years later cinchona bark was administered to the ailing Countess of Cinchon, and both doctor and patient were enormously impressed with the results. The Countess thereupon ordered large quantities of the bark for free distribution.

Vol. I

John W. Thompson, Editor

No. 3

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Contributing authors are staff members of the Office of Foreign Agricultural Relations unless otherwise designated.

Felipe A. Espil—*Our Mutual Friend*

One cannot study the history and progress of inter-American relations without encountering frequently the name of Felipe A. Espil, Argentina's Ambassador to the United States. His efforts to keep the diplomatic wheels running smoothly and his personal effect upon the success of numerous Pan American projects dates back more than two decades.

He received his Doctor of Laws degree from Buenos Aires National University in 1911 and practiced law in the province of Buenos Aires until 1918.

He first assumed a diplomatic post in Washington in 1919, when he was made First Secretary of the Embassy. He became Counsellor of the Embassy in 1924, Charge d'Affaires ad interim in 1925.

In 1928, Sr. Espil was called by his government to the post of Envoy Extraordinary and Minister Plenipotentiary to Holland.

He continued his diplomatic service abroad during 1929 and 1930 as Envoy Extraordinary and Minister Plenipotentiary to Denmark and Norway.

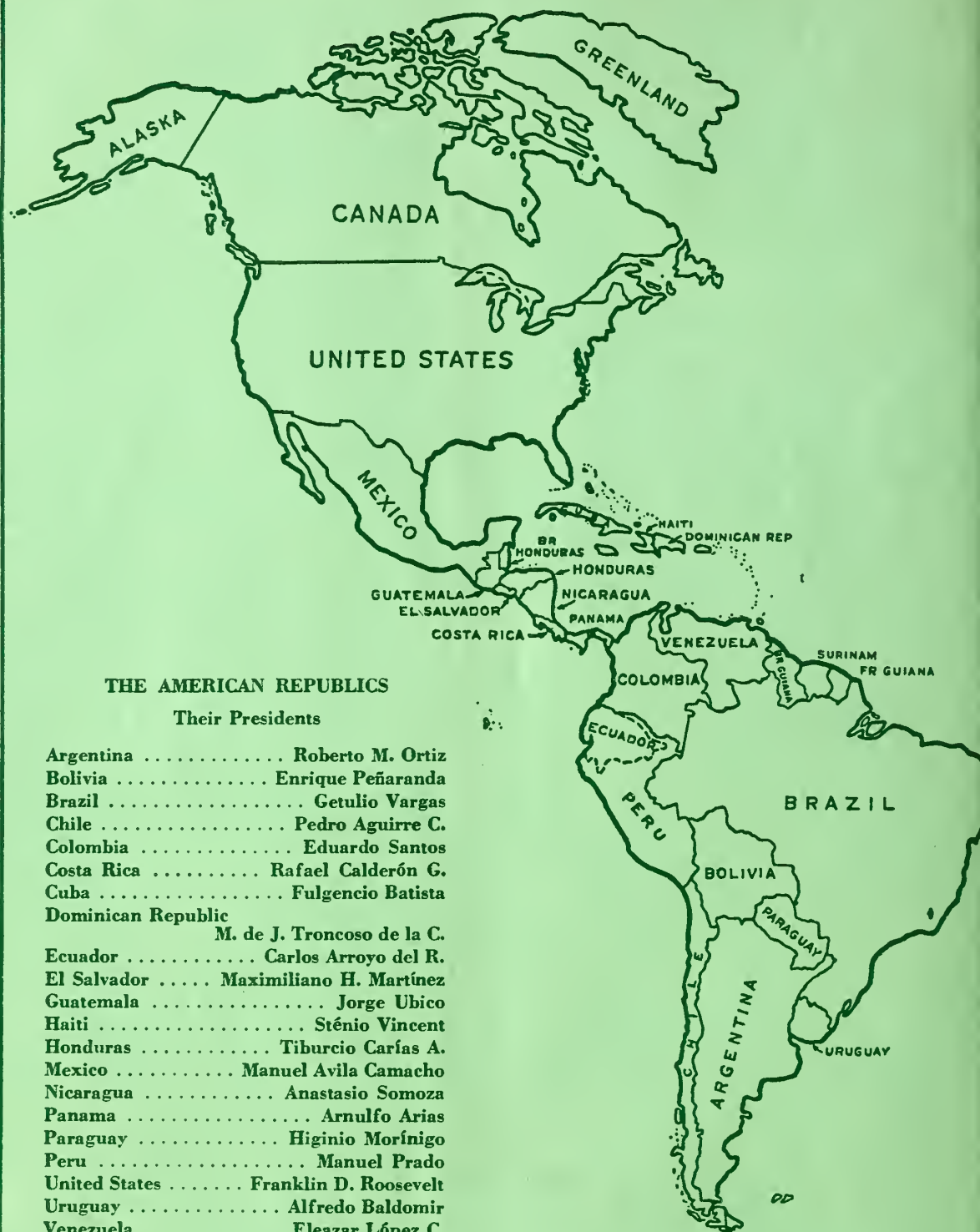
In 1931 Sr. Espil returned to Washington to serve as Ambassador.

During his sojourn in Europe he was Argentina's delegate to the International Labor Office in Geneva in 1926.

Since his return to the United States his activities in the diplomatic field have been many. He served as the Argentine delegate to the Pan American Conference in Havana in 1928; was the Argentine delegate to and Secretary General of the Inter-American Conference for the Maintenance of Peace held in Buenos Aires in 1936, and was the Argentine delegate to the Conference of Foreign Ministers of the American Republics in Havana in 1940.

Among the many recognitions of Sr. Espil's ability is an honorary doctor's degree from Brown University.

Widely known and widely liked, Sr. Espil is another of Our Mutual Friends who combines the somewhat rare qualities of intellectuality and common sense.



THE AMERICAN REPUBLICS

Their Presidents

Argentina	Roberto M. Ortiz
Bolivia	Enrique Peñaranda
Brazil	Getulio Vargas
Chile	Pedro Aguirre C.
Colombia	Eduardo Santos
Costa Rica	Rafael Calderón G.
Cuba	Fulgencio Batista
Dominican Republic	M. de J. Troncoso de la C.
Ecuador	Carlos Arroyo del R.
El Salvador	Maximiliano H. Martínez
Guatemala	Jorge Ubico
Haiti	Sténio Vincent
Honduras	Tiburcio Carías A.
Mexico	Manuel Avila Camacho
Nicaragua	Anastasio Somoza
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Paraguay	Higinio Morínigo
Peru	Manuel Prado
United States	Franklin D. Roosevelt
Uruguay	Alfredo Baldomir
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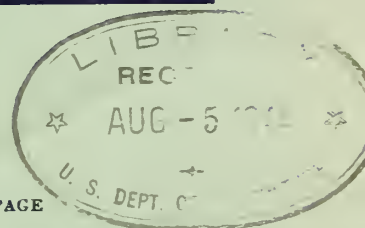
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Agriculture *Americas*

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Our Mutual Friend

May 1941

OFFICE OF FOREIGN AGRICULTURAL RELATIONS
UNITED STATES DEPARTMENT OF AGRICULTURE

J. J. Blandin—Whereof He Speaks

In the articles so far published on the subject of Western Hemisphere rubber plantations we have presented the Voice of Government. In this issue, for the first time, we present the Voice of Industry. This particular voice is that of J. J. Blandin, vice president of the Goodyear Rubber Plantations Co.

We present the views of Mr. Blandin because his personal history makes him a Voice of Experience as far as rubber plantations are concerned.

Joining the Goodyear organization in 1912, he went to Singapore in 1915, was in the Far East during the hectic years of 1915-18. While there he had charge of the early development of rubber plantations in Sumatra.

In 1923 Mr. Blandin was loaned to the United States Department of Commerce as technical advisor for the Government rubber survey made at that time, and he contributed the section on marketing for the report of that survey. He has learned the Latin American possibilities from first-hand observation.

Since 1925 Mr. Blandin has been in charge of Goodyear's plantation activities, directly under President P. W. Litchfield, and supervises all of the company's crude-rubber purchases.

—THE EDITOR.

WHY RUBBER IS COMING HOME

by J. J. BLANDIN,
*Vice President,
Goodyear Rubber Plantations Co.*

RUBBER is coming home. Rubber will continue to be raised in large quantities in the Middle East, in British Malaya and Netherlands Indies. Synthetic rubber will become more important. But it may be said, with considerable assurance, that rubber will also be raised in increasing manner in Latin America—that part of the world to which men formerly looked chiefly for their supply.

This statement can be made because it is to the interest, economic and military, of two important groups for more rubber to be grown in Latin America. It is to the interest of the United States because this country uses more rubber than any other and cannot itself raise rubber. It is to the interest of Latin America because it can raise rubber, can make money doing so, and has nearby a big customer to whom it may "trade" that rubber for manufactured goods which it needs. When a situation develops so exactly to the benefit of both parties we may feel reasonably sure that they will take advantage of it.

Still, it took a new world war to bring this about—plus a quarter century of painstaking scientific research, plus a sobering realization to North America of the grim necessities involved, and a far-sighted realization by the southern countries of the opportunities involved—together with a new spirit of understanding and cooperation which has grown up among all the countries of the Western Hemisphere.

All of which leads back to the story of rubber itself, a most strange, perverse, unpredictable, and useful material—and why it has now suddenly become important.

Of all the materials which the United States uses and does not produce, rubber is easily the most important, whether in dollar volume of imports or variety of uses.

Rubber is more important to an industrialized country such as ours than to a predominantly agricultural nation. Rubber is used to insulate electrical energy and to transmit electrical power in a thousand whirring factories. Rubber hose is used to load and unload tank steamers. Rubber belting carries ore and slag and crushed rock in mines and huge construction jobs. Rubber harnesses the great forces of compressed air and hydraulic power. These less known uses loom scarcely less significant than the more conspicuous part rubber has played in the revolution of transport brought by the automobile, the truck, and the airplane. Even these vehicles now are coming to demand more rubber for parts other than tires than for the tires themselves.

Defense Demands Rubber

The Nation's defense demands more and more rubber today. The modern high-speed, rubber-shod tank uses half a ton of rubber to its 20 tons of steel. The home, the office, the farm, and the shop use rubber in almost countless ways.

Keyed as this country is to a highly integrated industrialism, rubber is the most nearly indispensable material for which we must look to other nations for our supply. To call it a basic strategic material is understatement.

Of world consumption of more than a million long tons a year, costing around \$450 a ton at today's quotations, America alone orders a quarter billion dollars' worth a year, 60 percent of all that the world raises.

The matter of rubber supply and rubber price

has always been of concern to this country. The growth of the automobile industry was threatened in 1910 when speculators in Brazilian rubber ran the price up to \$3 a pound—since the evolution of the automobile as a universal vehicle depended on reasonably priced tires. If the plantations which sprang up in the Middle East in response to high world prices had not done so, the further expansion of the automobile industry might have been stunted by a shortage of rubber. World needs were already outrunning the production possibilities of the Amazon Valley, where wild rubber trees were scattered over thousands of square miles of jungle, remote from civilization.

Though the plantations assured this country of an ample supply, this country was not altogether happy over the result in having to look for its rubber not to neighboring countries to the south of us but lands half way around the world, 7 weeks distant by slow freighter, necessitating the carrying of inventories of almost half a year's needs—of which perhaps only 2½ months' supply would be actually in this country at any one time and the rest of it en route, or merely contracted for, or in warehouses and shipping ports 13,000 miles distant.

All The Rubber We Needed

Still the opening of plantations meant that we could get all the rubber we needed. Large amounts of European capital, British, Dutch, and French, were being invested, in addition to what the natives might produce—and these plantations could be quickly expanded to meet growing requirements of the future. Also the rubber-growing areas were controlled by nations traditionally friendly to this country.

Into this situation, however, came the impact, curiously enough, of an industrial thinking we may call the American System, which through mass production and high wages sought low costs

and expanding markets—with effects in this case which only now, after a quarter of a century, are beginning to make themselves felt. It is a story, I think, which has not before been told.

I can best make this clear by tracing the thinking of a business leader whom I know best—Paul W. Litchfield, who had joined the young Goodyear Tire & Rubber Co. in 1900 as superintendent and had seen his company emerge in 16 years to be a large tire manufacturer—and who was sharply reminded from time to time of the effect of rubber-price fluctuations on the fortunes of his company—and the growth of the automotive industry.

Mr. Litchfield is well known as a production executive, where direction of research had had broad effect on the industry, including the evolution of truck transportation; he is known for his liberal views on labor and for his interest in aeronautics. Fewer know of his consuming concern with crude rubber.

And yet no single factor weighed heavier in the progress of his company. He had seen prices catapult from 40 cents a pound to \$3 in the early days, would see it collapse from 55 cents a pounds in 1920 to 12 cents in 1921; see it rebound to \$1.23 under the Stevenson Act in 1925, drop to a ruinous 3 cents 7 years later.

The change of a cent a pound in normal times meant loss or gain of 1½ million dollars in the company's inventory. From his first days with the company Mr. Litchfield gave the matter his personal attention—a responsibility which 40 years later as chairman of the board he has still not been able fully to unload.

When he arranged in 1916 for his company to open a plantation in Sumatra it was with some misgivings. Rubber growing calls for large capital investment, and Sumatra would become the company's largest outside the United States. It was already pressed for money to finance its own rapid growth and to keep pace with the



Spreading latex on sheet to dry.

Bureau of Plant Industry photo.

seemingly insatiable demands of the automotive industry. Despite the importance of the new project Litchfield would not be able to give it first-hand attention. Year after year more immediately pressing concerns at home made it impossible to take 3 or 4 months out of his business calendar to go out there. He would direct the growing of rubber for 20 years before he ever saw a rubber plantation.

It would be much better if the investment could have been made closer by—somewhere south of the Rio Grande. But the wage differentials between the 20 cents a day of Netherlands Indies and the wage scales of Latin America seemed to be an insuperable barrier to growing plantation rubber in this hemisphere. The question Litchfield put to himself was whether or not American industrial methods might be used to make labor costs loom less important in laid-down costs in San Francisco and New York.

It would be 20 years, with an intermediate stop in the Philippine Islands, before he could try the plan in Central America.

Writers on business have often assumed that an employer is interested in getting his costs down only in order to secure a larger profit. Generally there are other factors involved. In this case, Litchfield had other things in mind.

First, he realized he was going into a boom market and that the boom would not last forever.

High rubber prices dictated by the war, by increasing consumption and scarcity, had resulted in a furore of speculation in plantation shares, and large profits were the order of the day. Men were planting rubber feverishly in Malaya, Ceylon, and the Dutch Islands. Operating costs were high, but no one cared, for the price was so much higher as to still yield bonanza returns. Under the shrewd colonial

policy of the Dutch government, planters on its islands had to build highways, homes, hospitals, schools. They might import labor into sparsely populated Sumatra from densely populated Java—but must pay a specified minimum wage, and put a roof over the cost of living, and send them home when their time was up if they wanted to go.

Still profits were ample to cover all these contingencies.

Mr. Litchfield, in his office in Akron in 1916, could not foresee what exact turns future events would take but he realized that, with this flood of planting, production would eventually overtake demand, that overproduction and world surplus might well force the prices down to where the planter might have to compete on a basis of cost with native growers who had no overhead and no wages to pay.

Later studies prior to the Stevenson Act set plantation costs of rubber at 25 to 30 cents a pound. But the world then could get all the rubber it wanted at 15 cents a pound or lower. The lower prices effected retrenchments in costs and improved efficiencies, many of which were to be permanent.

We could have no assurance that rubber prices would still be high by the time, 7 years later, when our new plantations would come into bearing. As a matter of fact, the boom had burst before then, and the first rubber cost more than it was worth in the market.

The attack on costs in Sumatra followed the lines industry had used in this country. American business does not try to get its costs down by pushing wages down or loading more work on the back of its employees. High-wage employees enlarge and enrich the Nation's purchasing power, create thousands of new customers. Fatigue brings no savings but increases factory costs. American manufacturers paying high wages had long had to meet the competition of low-wage competitor nations. They had met it successfully, not by increasing tasks or

reducing rates but through better engineering and planning and layouts and the use of labor-saving machinery, so they extended the productive capacity of the individual workman—and with less effort on his part.

This was the system which Litchfield undertook to apply in Sumatra to find the lower costs necessary if rubber growing was to return to the Americas.

Attack On Many Fronts

The program had many phases. Loss of output through erosion was checked by engineering principles of terracing and drainage control. Planting of leguminous crops between trees did away with the floor-bare cultivation previously thought necessary, saved labor, and added to the fertility of the soil. A transportation system was set up substituting trucks and narrow-gauge railways and motorboats for the bullocks and water buffaloes, and the patient backs of native workers. Plantation units were laid out so that no tapper need carry his load more than a half a mile to the nearest field station. Miniature factories were set up strategically over the plantation to process the latex immediately and make it ready for shipment.

However, the most important possibility in reducing costs lay in increasing the average output per tree. It would take no more time to tap a high-yielding tree than a low-yielder, take no longer to empty a full cup of latex into the can than one in which the bottom was scarcely wet. This was the most important part of the entire program in its effect on world economics and in America's supply of rubber.

Under that program yield per acre on the plantation gradually increased from the 380 pounds average of 1916 to 500 pounds, to 800, 1,000, 1,200, and with still higher yields clearly foreseen.

The program involved merely the application on a huge scale of well-known horticultural and

agronomic principles, the discovery of variants through cross-breeding and the propagation of outstanding individuals. The cycle, however, was not a single season but the 5 to 7 years needed for a rubber tree to mature, and this, together with the fact that millions of trees had to be studied, required the most painstaking, tedious, and unbelievably patient effort on the part of the scientists.

One fact which may be of interest to the Western Hemisphere is that the effort was cooperative, with many plantations taking part, under the leadership of Dutch scientists long concerned with horticultural improvements in their eastern possessions.

Goodyear's own trees were marked and yield records carefully kept, just as a farmer seeks to discover the high-yielding cows in his herd. It was soon evident that yields varied extremely, good, bad, and indifferent—and that 70 percent of the rubber came from 30 percent of the trees. The others were shirkers.

The search was started for trees which were really outstanding, with yields double or triple those of run-of-mine trees. There might have been a few hundred such trees in a million. And no one could tell offhand whether or not their high yield was due to a specially favorable environment or to remote hereditary factors, throw-backs perhaps to some lusty great-grandfather tree sent over to Ceylon by Sir Henry Wickham in 1876. It would take 5 to 6 years in time and limitless patience to find out.

It would prove nothing to plant seeds from those high-yielding trees. They must take actual slips or buds from each one, graft them onto seedlings, cut off the top of the seedling once the graft was complete, let the slip from the parent tree grow up on that stem, a real part of the parent tree, a chip off the old block.

Some 35 such grafts were started for each of the high-yielding trees, and they were watched carefully during their growth of maturity. Results were as expected. Most of the grafted trees

grew up to be indifferent yielders, high, low, medium, proving that the productiveness of the parent was the result of accident, a specially rich soil, favorable drainage, or sunlight or other factor.

But in a few cases—only one or two out of a hundred—every one of the 35 grafted young trees grew up straight and tall and full latexed, reproducing exactly the yield and other characteristics of its parent. This discovery was important, and the "mother trees" became very valuable. Each became the starting point of a new clone, and from them unlimited numbers of trees could be developed with identical characteristics by the process of grafting buds on the root stock of seedlings of ordinary stocks. This was the process which provided the first generation of high-yielding trees.

Yields Go Still Higher

The second step was to seek still higher yields by selecting a pair of mother trees who had the highest yields and other desired characteristics and using them as parents, cross-pollenize their blossoms, in the hope of securing seeds, and trees therefrom, some of which might be superior to either of their parents.

Those mother trees presented a curious appearance during the "mating season." High platforms were built around them and cheesecloth bags placed around each cluster of blossoms, and there the powder-fine pollen from the male blossom of one tree was brushed by hand over the female blossom of the other tree with a bit of cotton placed as additional protection against accidental pollenization from unpedigreed and philandering neighbors. These trees might not mate with any Tom, Dick, or Harry of a tree whose pollen the wind or an insect might present. They could mate only with their peers.

The seeds of these unions ripened in time and were planted, and again the scientists must wait

through the 5-year cycle to see what happened. It could be certain that the offspring would still be mixed, representing many strains in Nature's curious demonstration of Mendel's law, but with the chance that out of the thousands one or two variants would appear, obtaining combinations similar to those found in remoter ancestry in the Brazilian forest, variants with yield and other characteristics superior to their parents. These then became the founders of new clones, the second generation. By 1941 the third generation was just beginning to appear.

Before this tedious experimentation was completed we were convinced by the results already obtained that it was safe to make the first move, to the Philippine Islands. Laws limiting land-holding to 2,500 acres prevented the establishment of large plantations in the Philippines, since the production from too small an estate would be negligible in a field where more than 3,000,000 acres are planted to rubber.

Labor laws barred the import of the low-wage Javanese, so an experimental estate in the Philippines might throw light on whether or not rubber could be grown commercially under a wage scale comparable to that of Central America.

Also it would provide a supply of budded stock under American control, free of export restrictions. The Stevenson Act had failed due to unrestricted export of rubber by Dutch and native growers, and a flurry of new planting which would later make itself felt in world supply. Already when we acquired a tract of 2,500 acres in the Philippines in 1928 there was talk of a new restriction program in which Dutch and French might join.

Experiments started in Sumatra were now carried on in the Philippines as well, while on its Dutch plantations low-yielding trees were gradually replaced with high yielders, and all new planting was bud-grafted with proved high-yield material, to make in time the largest bud-

grafted plantation in the world—with yield averages continuing to move upward.

The Philippines project was successful and in 1935 the third step was taken, the acquiring of acreage in Panama, and in the following year in Costa Rica.

The Fight Against Leaf Disease

But the question of whether or not improved technique developed in the Middle East would be sufficient to overcome the wage differentials of Central America must wait for the solution of another scientific problem. That was the presence of the South American leaf disease, which up to then had acted as additional deterrents to the setting up of rubber plantations in this hemisphere. The disease had not bothered the original wild rubber trees of the jungle, scattered as they were over vast areas but ran like an epidemic through stands of trees set up closely together. Plantations started in Trinidad, in Dutch and British Guiana, and elsewhere had been ravaged by the disease and abandoned. Spraying might check its spread, but only at prohibitive cost.

The Goodyear Plantations Co. attacked this problem head-on in acquiring in Costa Rica a site in the center of the disease, taking over an estate which had been planted to rubber years before and given up. If the disease could be combatted successfully in such a stronghold it could be defeated elsewhere.

It was noticed that of the 36,000 trees originally planted on the Costa Rica tract, some 3,600 were still standing. It was fair to assume that they had inherited a certain degree of resistance to the disease. It was a good starting point for the new job of cross breeding the high-yielding trees of the Middle East with disease-resistant trees of Central America. Simultaneously seedlings from the seeds of disease-resistant trees were bud-grafted with high-yield material flown in from the Philippine Islands. Latin American governments watched the exper-



Rubber-survey party member at work.



Bureau of Plant Industry photo.

Bud-grafting trees in Costa Rican nursery.

iments with interest, gave their cooperation, began setting up their own studies, exchanged findings.

It was not part of our plan to set up huge plantations or to attempt to grow all our own rubber. Of its 92,000 acres in Sumatra, only 60,000 are planted, the remaining 32,000-acre tract being held for future requirements. But if our entire acreage in the East were in full production it would still produce only enough rubber to run our factories for 3 months out of the year.

Our objective in Latin America was to see what new problems, climatic, soil, or others, were involved and to prove, if possible, that they could be solved and that rubber cultivation was practical. Once that demonstration was given the company hoped that small tracts, family size, might be set up by the thousands throughout the great rubber belt of the Americas. After

all, 50 percent of the rubber grown in the Middle East is not grown on large plantations but by countless thousands of natives having plots of few acres.

Simple processing machines have been developed, much like the mangle of wash day, on which the coagulated rubber might be sheeted out, the water squeezed out and more uniform quality secured. For coagulating tanks, the familiar gasoline cans cut in half, which the natives in the East used, would serve to start Central and South American families in the rubber business at little initial expense.

Our plantations and others that might be started by nationals in the various countries interested would be nuclei for smaller tracts, assisting in processing, marketing, and furnishing a supply of high-yield seeds and bud stock.

The battle against the leaf disease is not

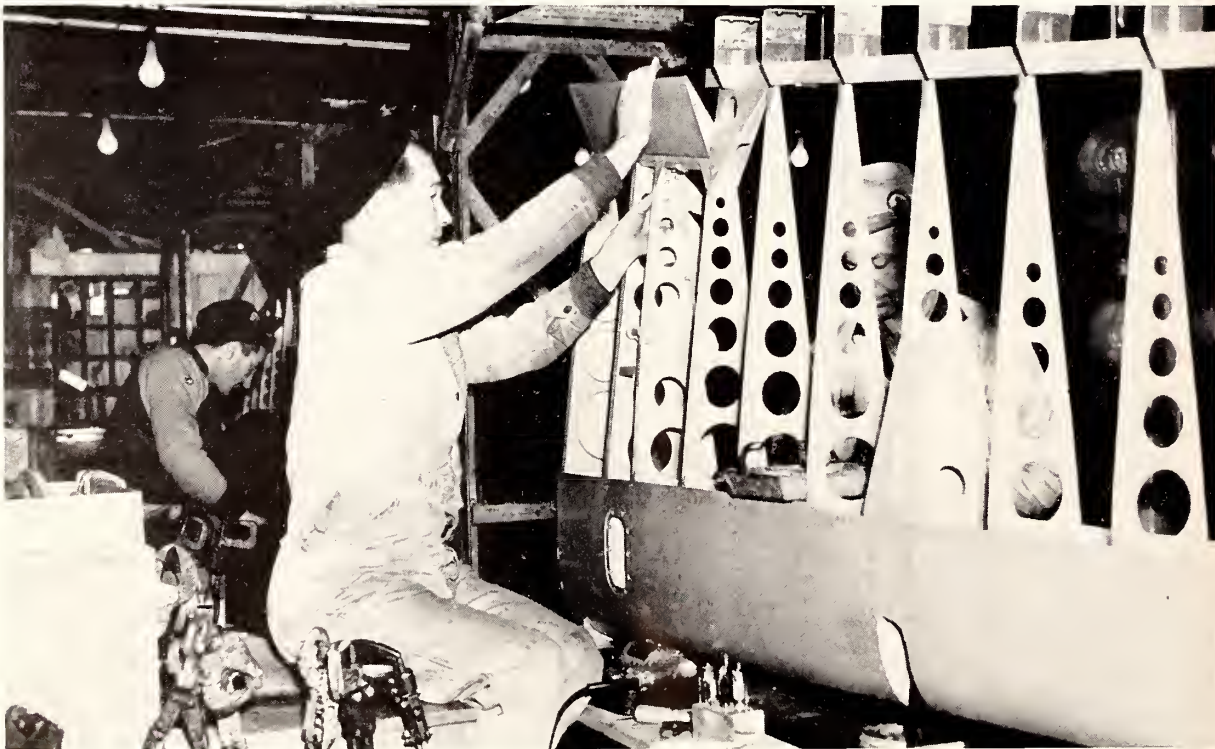
(Continued on page 10)

Strong Rubber Sinews . . .



Rubber for barrage balloons.

Rubber for aircraft.



. . . For National Defense



Rubber for gas masks.

Rubber "shoes" for tanks.



ended, but even the scientists, careful in their statements, are willing to admit that they can see light ahead.

All this had been under way as a horticultural experiment, attracting little attention from the outside world till new international events gave it striking significance. That was the outbreak of war in Europe.

Holland and France were overrun by Hitler's legions, Great Britain was threatened, and their rich colonies in the Middle East, source of 98 percent of the world's rubber supply, became tempting prizes of war.

Hemispheres On The Alert

This brought both hemispheres to the alert. There was peril involved to the United States, which consumes nearly 60 percent of the world's rubber. There was opportunity ahead for nations which could produce rubber. The matter of whether or not rubber could be raised commercially in this hemisphere was no longer an academic question but an urgent economic and military necessity.

Distance, with the uncertainties of transoceanic shipment, was an inconvenience, but the possibility of seizure of the chief rubber-growing areas of the world by an unfriendly power, which could, if it chose, dictate terms and prices at which the world might get rubber, constituted a situation of extreme gravity.

The U. S. Department of State and the U. S. Department of Agriculture held a conference with officials of Central and South American nations, found them interested and ready to cooperate. Surveys of areas were instituted in conjunction with experts from the various countries. Experimental stations and nurseries are being established.

American plantation owners were consulted, were glad to make their experience and personnel available. Goodyear in Central America, Ford in Brazil, had made headway in fighting

the leaf disease. All were certain what other problems remained could be solved in time. A pooling of all scientific and agronomic effort and resources was to everyone's advantage. With many men working on it and exchanging results, the project could move ahead much faster.

We had one other thing to contribute—an extensive supply of proved high-yielding stock, unrestricted of export, from the Philippine Islands. The company made an agreement with the United States Government to make this available to nations of this hemisphere cooperating in the program and to share the results secured from the joint studies. Now seedlings and budwood are being rushed by fast steamer and airplane to nations interested. It is of interest that to keep them fresh they are carried in air-tight containers made of a filmlike packaging material derived from rubber. If the scientific problems are solved and high-yielding trees resistant to disease can be raised successfully in Latin America, the economic problem still remains. Rubber over the long swing must be raised at a price reasonably comparable to that in the Near East and cheaper than synthetics.

No country in South or Central America is interested in growing rubber only for the duration of the emergency, for that hypothetical period during which eastern rubber might be held for ransom or held off the market entirely. If Latin America goes in, it will go in to stay. Its problem then is to become competitive in cost, despite its higher-priced labor, with the costs secured by the 20-cents-a-day Javanese tapper.

By taking full advantage of favorable soil and climatic conditions in the Americas and utilizing modern engineering methods, the widening field of research which is opening up higher and still higher yields, plus the sympathetic cooperation being given by interested governments, there seems no reason why this cannot be done.

No reason why rubber should not come home.

Watering Mexico's Deserts



United States Lines photo.

by EDWARD C. HIGBEE,
*Junior Soil Conservationist,
Soil Conservation Service,
West Salem, Wis.*

THOUSANDS of Mexican farmers are rubbing their eyes incredulously while a dream as old as Mexico itself comes true in their lifetime. Water—great reservoirs of it—and vast networks of irrigation canals are appearing in the deserts from Sonora to Tehuantepec. The land, recovering from its thirst, is growing green with crops.

It is difficult to estimate what all this means in terms of human betterment. Reduced to figures, it is the irrigation of more than 3 million acres for 120,000 Mexican farm families.

As we rode from Villa Juárez to Valles not so long ago, Amadeo García explained how it would affect him. At that time García owned a small farm in San Luis Potosí. Because of the low rainfall in his district he could not grow crops enough for a living. He became a migrant

worker 6 months of each year. When he had work García sent money to his family. When he could find nothing to do, they too often went hungry. He told me that soon this would be changed. A new irrigation project was being developed near his home. Being eligible for credit from the Banco Nacional de Crédito Agrícola, García would establish himself on irrigated land where there would be work the year around—hunger would no longer haunt his family.

The development of irrigation projects is an "all out" program in Mexico. This year 55 million pesos (about \$11,289,000), the largest budget in history for irrigation, was announced by President Avila Camacho. Irrigation in Mexico has been practiced since the days of the Maya and the Aztecs, but modern development of great projects was not initiated until 1926, when an expenditure of 3 million pesos (about \$615,750) was made. Plans already have been

made for continuous development during the next 21 years. In all, the bill will be more than 600 million pesos (about \$123,151,000).

The job of administering this tremendous task is in the hands of the engineers of the Comisión Nacional de Irrigación. The work already accomplished is a monument to their energy and technical skill, for the obstacles have been many.

Starting from scratch, they made a reconnaissance soil survey of the entire country for preliminary studies of the land. To make detailed soils maps of specific projects, the engineers are differentiating and correlating soil types of these particular areas for the first time in history. They are making original topographic surveys by aerial photography. A chain of weather bureau and hydrologic observation stations is being maintained throughout the country. Varied and specialized as these tasks are, they are but a few of the duties of the Comisión.

Each project considered by the Comisión is carefully scrutinized as to economic and social potentialities. Work is done only where there is vital need. In areas where production is insufficient for the population or where costs of transportation are high, the Comisión will try to establish a project. The primary purpose of these large irrigation plans is to produce more and cheaper food for the nation and to open new areas of production to farmers living on sub-marginal lands.

Typical of the problem areas in which work is being done is Huichapán in the State of Hidalgo. The population of Huichapán declined from 12,000 in 1880 to 2,139 in 1935. It was impossible for the farmers in that area to grow corn cheaper than it could be shipped in by rail. Due to inadequate rainfall and primitive agricultural methods, the corn yield averaged only 15 bushels an acre in good years. Frequently crops failed and farmers, facing starvation, were forced to abandon their land.

Today Huichapán is in the process of becoming a model agricultural community. The

Presa Madero is nearing completion. It will dam the waters of Arroyo Hondo and supply 3,200 hectares (7,907 acres) of wheat, corn, beans, chili, and fruits with water—and life.

The Comisión Nacional de Irrigación is not content with establishing a constant water supply for parched acres. It is out to overhaul completely Mexican agriculture and rural life.

Irrigation And More

The engineers of the Comisión are almost as interested in introducing improved seed and better breeds of livestock as they are in irrigation. Hampshire boars, Leghorn hens, Hereford bulls, and certified Marquis wheat seed are every bit as important as Portland cement and reinforcing steel. As they look at it, their work includes rural and village electrification, substitution of the steel plow for the wooden arado, and introducing crop rotation on lands which have been planted annually to corn for a hundred years.

Their work and plans include adoption of erosion-control and soil-conservation practices, establishment of experimental farms and laboratories, resettlement of farm families on newly irrigated lands, building roads, draining swamps, and founding whole agricultural communities. Most important of all, this impressive-sounding work is far beyond the paper stages.

About 35 miles southwest of Laredo, Tex., in the center of the Rio Salado project, is Ciudad Anáhuac, the first agricultural community fostered by the Comisión Nacional de Irrigación. This city was developed as an urban hub to serve the needs of the surrounding 117,000-acre Rio Salado irrigation district. It is a complete metropolitan center with its own schools, banks, mercantile houses, processing factories, clinics, and recreational establishments.

Sixty miles southeast of Chihuahua is Ciudad Delicias, the second agricultural city of Mexico, located in the center of the flourishing Rio



Mexican Government photo.

Rodriguez Dam in Baja California.

Conchos irrigation district. There nearly 60,000 acres of cotton, wheat, peanuts, corn, and melons are raised. An additional 100,000 acres soon will be under cultivation when the Boquilla and Colina Dams and hydroelectric generating stations are completed.

The function of the Comisión Nacional de Irrigación compares with that of several Federal agricultural agencies in the United States. It is our Bureau of Reclamation, Soil Conservation Service, Rural Electrification Administration, and Farm Security Administration all rolled into one. In Mexico, as in the United States, farm aid comes in response to the appeal of farmers through their democratic organizations. The work program of the Comisión Nacional de Irrigación springs from grass roots. Here's how it works:

A group of farmers or an entire community petitions for an irrigation project and all the

trimmings. The Comisión then makes a thorough survey. Air photos are taken of the area from which topographic maps are made. Detailed soil surveys and laboratory analyses of field samples follow. Soils are classified according to their agricultural-use capabilities, with and without irrigation. Agronomists study the crops and cultural practices of the region. Meteorologists gather and correlate local climatological data. Hydrologists compile data on stream flow and silt loads and economists study costs and values. The blue print of the final project is the work of a dozen specialists.

The great La Angostura Dam in Sonora was completed last December. This dam is the keystone of one of the most ambitious projects undertaken by the Comisión Nacional de Irrigación. Built to conserve the waters of the Bavispe River, a tributary to the Yaquí, it has a storage capacity of 1,270 million cubic meters. It will stabilize

the flow of the Yaquí River and make possible the irrigation of some 125 thousand hectares (308,875 acres) on the Pacific coast, near Guaymas. In addition to creating this vast area of productive land out of the Sonoran desert its turbines will generate about 30,000 hp. to electrify the Yaquí Valley.

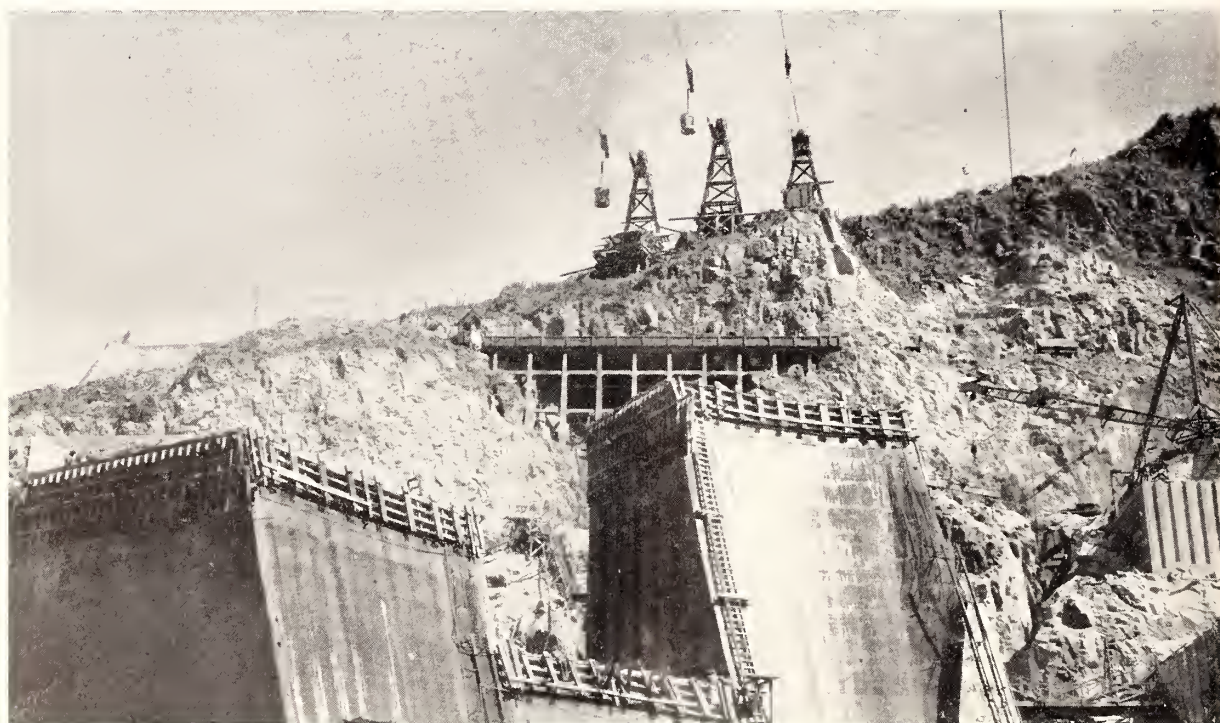
To supplement the work of La Angostura, two other dams, El Aguila and Camellón, will be completed in the near future as a part of the Yaquí project and thereby triple its irrigated area and electric power.

So the story continues in nearly every State of Mexico. The irrigated Imperial Valley of California and the Lower Rio Grande of Texas have their counterparts under construction across the border in Baja California and Tamaulipas. In the world-famous Durango cotton country, 300,000 hectares (741,300 acres) will soon be under irrigation. This project, El Palmito, ranks with La Angostura in national significance. Far to the south, at the Isthmus of Tehuantepec, a tropical garden of more than

50,000 hectares (123,550 acres) of sugarcane, bananas, and pineapples will some day flourish.

The problem of financing often impedes the best of plans. But in the program of promoting irrigation the Mexican treasury, through the Banco Nacional de Crédito Agrícola, has been most cooperative. Appropriations for this national need are among the highest in the Republic's budget. All projects, however, are operated on a pay-back basis. Amortization payments are reasonable and as money is repaid it replenishes a revolving fund available for further irrigation developments.

Irrigation not only will bring gradual modernization of agriculture and improvement of rural life to Mexico but it will also provide the foundation for new industries in regions of potential wealth. The energy and faith of the Comisión Nacional de Irrigación in carrying out this plan is typical of those workers in agriculture throughout the Western Hemisphere who are striving to build in the Americas a higher standard of living and a greater security for all.



Angostura Dam in Sonora.

Mexican Government photo.

ALONG THE AGRICULTURAL FRONT

INTER-AMERICAN ARBITRATION

In a six-point American "inner-defense" program, C. V. Whitney, President of the American Arbitration Association, included in his acceptance speech a plan to "... develop better business relations in inter-American trade through the elimination of misunderstandings in Latin American markets." According to the President of the Association, the best way this can be done is through the establishment of common standards of business practices and coordination of commercial and governmental efforts. Central arbitration boards are being established in major industrial areas in South America in order to coordinate the work.

RUBBER PLANTATIONS' REPORT FAVORABLE

Rubber plantations in the State of São Paulo, Brazil, are receiving favorable reports from the experimental stations. Farmers are said to be recognizing the possibilities of rubber plantings for providing shade for other plants, for the production of a good drying oil from the rubber seeds, and for the residue from rubber plantings providing animal feed and fertilizer of excellent quality.

AGRICULTURAL DEPENDENCY

Most Latin American countries are dependent for their prosperity on the export of one or two agricultural commodities. Argentina and Uruguay, for instance, depend on cattle and grain. Brazil and Colombia are heavily dependent on coffee. The majority of Central American countries rely mainly on coffee and bananas. The Caribbean area is dependent mainly on coffee and sugar.

FOREIGN TRADE STUDIED

Adverse effects of the European conflict on certain Cuban industries are to be studied by a commission appointed by the Cuban Government. Abnormal trade conditions, restriction of world markets, and rising costs of necessary raw materials on which many of the industries are dependent are some of the problems to be studied. The commission will make a survey of conditions and propose effective measures to avoid an impending cycle of rising costs and diminishing production and employment.

BRAZIL INCREASES FIBER-PLANT PRODUCTION

Cultivation of plants suitable for large-scale production of fibers to substitute for imported jute is now under way in Brazil. The head of the Agricultural Development Service in the State of São Paulo has started an intensive campaign to increase production of various fiber plants, particularly sisal, ramie, and Papoula de São Francisco.

CRUDE RUBBER DEVELOPMENT PACTS

Mexico and the United States have completed an agreement to conduct scientific experiments in rubber production, in order to develop parts of Mexico into rubber-producing areas. Similar agreements have been made, or are expected to be made soon, with Costa Rica, Honduras, Nicaragua, and Guatemala.

CUBAN HORTICULTURAL STATION

To demonstrate to Cuban farmers the proper methods of silviculture and to test new varieties of seeds and buds, a horticultural demonstration station has been established at El Cano, in Havana Province.

MORE INDUSTRY FOR LATIN AMERICA

What may prove to be a permanent solution to the problem of unsettled trade conditions in Latin America is the recent establishment of the Inter-American Development Commission, with its main offices in Washington. Two members of the commission are now in Latin America to establish branch offices.

Many countries in Latin America have great possibilities for industrialization. The purpose of the new commission is to stimulate production of Latin American raw materials that are useful to the United States defense program and to start new industries in the American Republics which will manufacture consumer goods formerly purchased from Europe.

RUBBER-GOODS FACTORIES IN CUBA

Plans for the establishment of two rubber goods factories in Cuba—one near Havana and one in Matanzas—are nearing completion. It is said that these factories may supply the local demand for manufactured rubber goods which, in the past, have been imported.

NEW LABORATORY OF MINES

As a part of the plan to intensify the agricultural activities of Cuba, Joaquín Pérez Roa, Minister of Agriculture, has announced the establishment of a Laboratory of Mines, equipped to make analyses, experiments, and identifications of minerals. It will also serve as a consultation service and a source for data on the mineral deposits of the island.

MEXICAN AGRICULTURAL SURVEY

Governments of Mexico and the United States are cooperating in a survey to determine prospects for expanding production in Mexico of crops which are needed in this country but are not produced here. The survey will begin in May and continue several months.

The work is being undertaken at the request of the Mexican Foreign Office, with cooperation of two U. S. Department of Agriculture agencies, the Bureau of Plant Industry and the Office of Foreign Agricultural Relations.

Assigned to the survey are two experienced tropical agriculture specialists from the Department, James H. Kempton and Harry T. Edwards of the Bureau of Plant Industry. Mr. Kempton has carried out several exploratory surveys of Mexican agriculture for the Carnegie Foundation, and Mr. Edwards was formerly Director of the Bureau of Plant Industry in the Philippines.

RUBBER SURVEY PARTY RETURNS

The last of the four Bureau of Plant Industry rubber-survey parties has returned to the United States from Haiti. The group explored prospective rubber zones in Panama, Costa Rica, Venezuela, Colombia, Haiti, and Santo Domingo. One member of the original field parties remained in Brazil to lead an expedition into Matto Grosso.

BANANAS FOR LAUNCHING SHIPS

Seven thousand pounds of bananas were used recently for launching a 413-foot cargo ship at Beaumont, Tex. It is expected that using bananas in this way, instead of launching grease, will increase considerably United States consumption of this Central American export.

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Carlos Martins Pereira e Sousa—*Our Mutual Friend*

The great, sprawling country of Brazil, with a language different from its sister American nations, with an almost complete range of climatic conditions, soils and products, with a rapidly growing economic strength, the power of which has only begun to be felt, requires an able Ambassador in Washington. In Carlos Martins Pereira e Sousa, Brazil has the answer to this diplomatic necessity.

Snr. Martins was born in Porto Alegre, Rio Grande do Sul. He received his education at the Porto Alegre Law School where he was granted the degree of Bachelor of Juridical and Social Science.

After practicing law in Rio Grande do Sul and achieving prominence in his profession, Snr. Martins was appointed Assistant District Attorney and later District Judge in the city of Pelotas.

He entered the diplomatic service in 1906 as Second Secretary in which capacity he served in Asunción, Paraguay; Berlin, Vienna, St. Petersburg, and Rome. He was made First Secretary in 1918. As his career progressed he served as Resident Minister at Quito, Ecuador, and as Consul General at Amsterdam.

Snr. Martins was Minister Plenipotentiary to Copenhagen, 1931-33; Ambassador to Denmark in 1934; Ambassador to Tokio in 1934 and 1935; Ambassador to Brussels until 1938. He received his appointment as Brazil's Ambassador to Washington in 1939.

He is the author of several books including "Contra a Dynamica da Guerra a Technica da Paz"; "Problemas do Dia"; and "Politica de Imigração."



THE AMERICAN REPUBLICS

Their Capitals

Argentina	Buenos Aires
Bolivia	La Paz
Brazil	Rio de Janeiro
Chile	Santiago
Colombia	Bogotá
Costa Rica	San José
Cuba	Havana
Dominican Republic	Ciudad Trujillo
Ecuador	Quito
El Salvador	San Salvador
Guatemala	Guatemala
Haiti	Port-au-Prince
Honduras	Tegucigalpa
Mexico	Mexico City
Nicaragua	Managua
Panama	Panamá
Paraguay	Asunción
Peru	Lima
United States	Washington
Uruguay	Montevideo
Venezuela	Caracas

Agriculture IN THE *Americas*



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June 1941

OFFICE OF FOREIGN AGRICULTURAL RELATIONS
UNITED STATES DEPARTMENT OF AGRICULTURE

Advance on All Fronts . . .

In this issue, E. W. James writes of the Pan American Highway, a project dear to his heart and one with which he has been identified since its inception.

Particularly interesting is the clear exposition he makes of the interdependence existing between good roads and the development of agricultural opportunities in the Americas.

How often we tend to overlook this interdependence! "If only we could stimulate some travel," say some, "inter-American relations would be greatly improved." Others think that more loans or more cultural exchange would do the job.

The truth of the matter is that no panacea exists for the problems that beset our Americas. The interdependence which Mr. James so pointedly calls to our attention with regard to the effect of good roads on agriculture permeates the entire fabric of inter-American relations. For instance, one would not need much prophetic vision to see how the completion of the Pan American Highway could act as a leaven in the lives of many of the communities through which it will pass. New faces, new ideas, new ways of living will be brought to centers that have never before experienced the advantages of international contacts.

We must advance on all fronts simultaneously in our march toward inter-American understanding. Mutual intellectual penetration alone is not enough. Neither will the solution of our surplus commodity problems alone insure us of everlasting harmony in the Americas. It is the judicious combination of these and other desirable goals that holds forth the greatest possibilities for cooperative living in the American side of the world, which may in time prove an inspiration to others.

To bring this about requires the wholehearted and intelligent cooperation of farmers, scientists, businessmen, artists, teachers, students and people in many walks of life both in our country and in other American lands.

Artery of the Americas



Bureau of Public Roads Photo.

A Guatemalan section of the Pan American Highway.

by E. W. JAMES

WHEN you want to go from one country to another in Central America, the surest way to get there is to fly or take a boat. If you are allergic to air and water and insist on traveling overland, the safest bet is to strap a kit of provisions on your back and set out on foot, hoping for the best.

That is not literally true, of course, but it is less of an exaggeration than one who has never been in Central America might suppose. Through no particular fault of its own, each country has been figuratively walled in—by a dense jungle, an unspanned river, or a similar barrier.

For several years, Mexico and Guatemala have had towns at railheads approximately 3 miles apart on opposite sides of the Suchiate River, but the cost of crossing the gap was so high that it has never been bridged. Not until the last year was a highway bridge built to connect the highway systems of the two countries.

Between Panama and Costa Rica, it is almost necessary to organize an exploring party to make an international trip, so dense and track-

less are the jungles that separate the two republics.

Except for Guatemala's connections with El Salvador and with Mexico, no other pair of countries in all of Central America has adequate facilities for crossing the common frontier on land.

Travelers who have the price can fly over the frontier, but plane rates have not reached the point where goods can be transported in large quantities by air. Nor is ship transportation possible if goods cannot be brought to the seacoast.

This lack of trade among the nations of Latin America, and particularly of Central America, has been one of the chief factors that has tended to retard the development of the whole area for years.

Since railroad construction is extremely costly, the cheapest transportation that can be made available to overcome this difficulty is obviously by a highway connecting the countries. And that is precisely what the Pan American Highway, which some day will connect 18 of the

American Republics, is expected to do. It will furnish the trunk line for general transport in the region and provide the beginning of a common international distribution system.

If the highway can accomplish this (and there is every reason to think that it can), then one of the chief barriers to a better standard of living in Central America will have been removed. To almost as great an extent, it can perform the same service for South America. By doing these things, it will have had a prominent role in the development of the entire Western Hemisphere.

When a large fraction of the population of a country is on a diet of very limited variety, it

E. W. James, author of this article, is a veteran in the fields both of highway-building and Pan American relationships. Since 1929, he has been chief of the U. S. Division of Highway Transport, which was formerly part of the Bureau of Public Roads, Department of Agriculture, and now is in the Public Roads Administration, Federal Works Agency. In this position, he is in charge

is a serious matter if a shortage or failure occurs in any of the few crops essential to that diet. Practically all of the countries from Mexico south through Panama depend on rice, beans, and corn as the principal dietary staples for most of their people.

Hardly a year passes that a shortage in one or another of these staples does not occur in some country. A neighboring country may have a surplus of the same crop. But the people, many of them farmers who depend on each year's crops, cannot afford to pay the prices that would be necessary to make it possible to import and distribute food under existing transport conditions. A shortage of more than neighborhood proportions therefore, results in hardship and in a lowering of the dietary standard, which is already not much above the subsistence level.

The lack of frontier communication in Central America is chiefly the result of historical conditions. Settlements were usually made in colonial times at centers away from the coasts. The higher altitudes of these inland areas were more healthful, since the coasts usually were malarial and generally uninviting as dwelling places. It is said, too, that fear of the buccaneers and sea rovers had its effect in urging the colonists inland.

Each of these population centers constituted the nucleus of a local government in colonial days, and the attitude of separatism that grew up has continued to exist among these countries since they gained their independence. All of these things account for the lack of adequate communication at the frontiers. Socially and politically, therefore, the Pan American Highway may have a very beneficial and stabilizing influence.

Certainly, it will result in more orderly trade among the countries. Today, unfortunately, while efforts toward international trade are continually being made in Central America they

of surveys and construction on the Pan American Highway. Mr. James has been a delegate to each of the three Pan American Highway Conferences, those in Panama in 1929 and 1931 and that at Santiago, Chile, in 1939. In 1929 and 1930 he was consulting highway expert to the Republic of Colombia. In the latter year he was an honorary delegate to the Mexican National Highway Congress.

commonly take the form of smuggling, which persists in spite of transportation difficulties. Usually these efforts are on a very small scale and at best cater to a strictly localized demand. The only exception consists possibly in the running of cattle, which sometimes reaches considerable proportions.

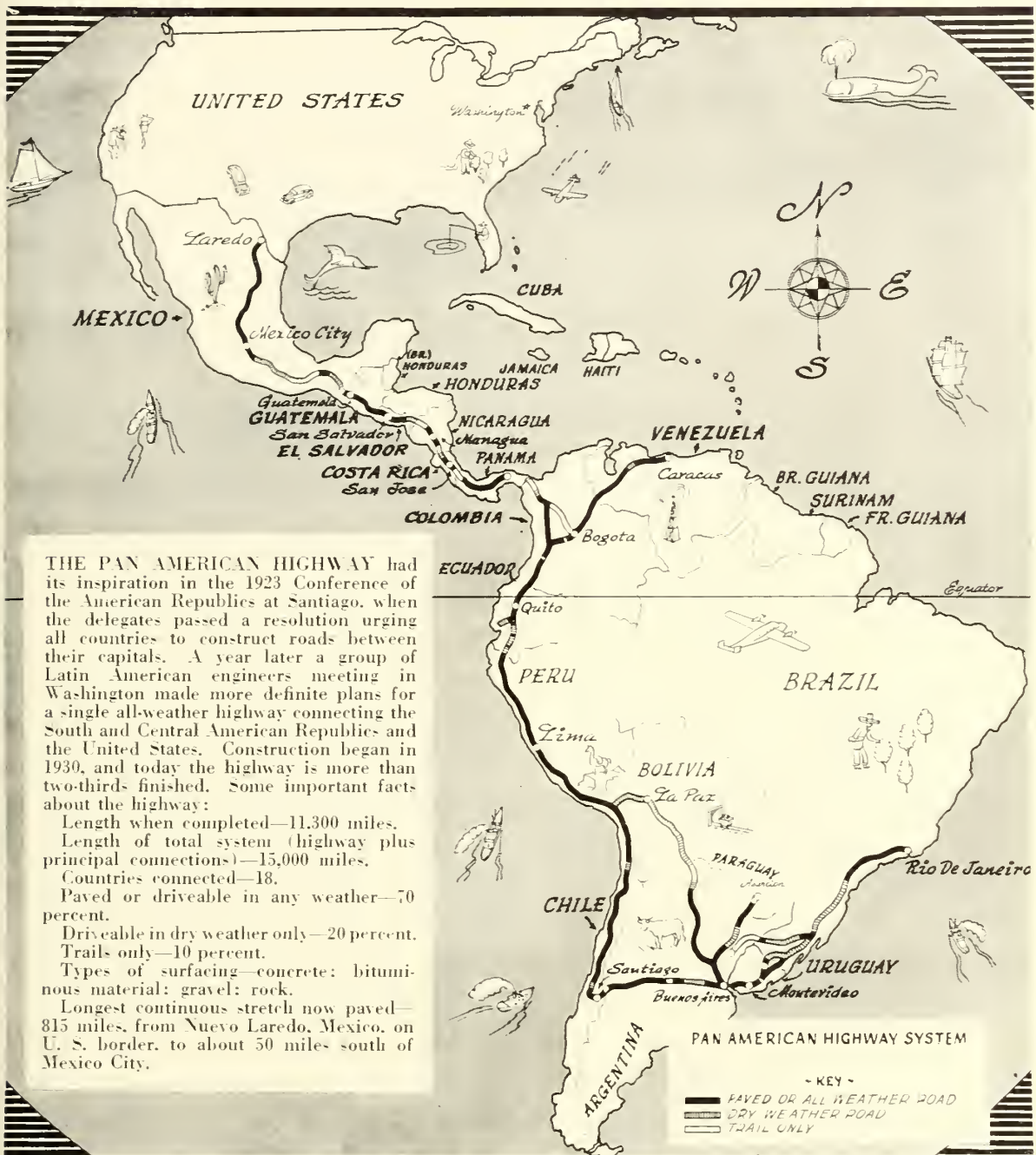
All of the countries maintain *resguardia* stations, and in at least one case the station has a mounted patrol which rides the border. Established lanes of communication not only would facilitate international shipment of foodstuffs, but would control it, and the countries would be encouraged to develop a reciprocal trade to the advantage of all.

In some of the countries, large areas remote from the capital towns remain still undeveloped, and in several cases these areas will be crossed by the proposed line of the Pan American Highway. The road will, therefore, serve to open new lands to development.

This aspect of highway construction will be pronounced and in two or three of the republics may lead to substantial changes in their internal economy. For instance, the Province of Guanacaste in northwestern Costa Rica is a large cattle raising area, but at present driving cattle to the central plateau, where the bulk of the population lives and where the big local demand exists,

THE PAN AMERICAN HIGHWAY

For Hemisphere Travel, Commerce, and Defense.



Map by Agricultural Adjustment Administration.

CONDITION IN SOUTH AMERICA

CONDITION IN CENTRAL AMERICA

Three-fourths of route paved or driveable in any kind of weather.

About half complete: 300 miles from Canal Zone to Colombia unsurveyed.

results in considerable loss of weight and lowering of quality. The proposed highway crosses the center of Guanacaste Province, touching at every important town, and when completed will permit motorized transportation of beef cattle at a minimum cost. This same condition prevails south of Rivas in Nicaragua.

In southern Costa Rica there is a valley along the Rio General which is practically isolated today. From all reports it is one of the most promising agricultural areas in the republic. The cultivation of rice and bright tobacco should be greatly encouraged by the construction of the highway, which will follow the river the length of the valley. The mountains which border the valley, especially on the north side, carry heavy stands of hardwood which will become marketable following the construction of the road. It is unfortunate that the Costa Rican areas now most promising for rubber culture lie for the most part along the coasts and, therefore, will not be directly reached by the road.

In eastern Panama this condition is reversed, however. There, one of the proposed highway locations south and east of the Canal Zone cuts directly through a large area in the Chucunaque Valley, which is indicated as a favorable region for the cultivation of Hevea rubber.

On the Chiriquí plateau in western Panama, at an elevation of about 4,500 feet, most of the vegetables and small fruits of the Temperate Zone can be successfully grown. The yield of some vegetables and fruits is prolific because of the deep volcanic soil, and if truck transportation can be provided to the Canal Zone, Panama City, and Colón, there should be a large market for the Chiriquí products. Securing and handling perishable food products in the Canal Zone has always presented a difficult problem which may be largely solved by raising such foods in Chiriquí and delivering them by truck over the 350 miles to the Zone. There is no such traffic today because the highway in the 40-mile gap beyond David has not been constructed.

Several years ago, the present Commissioner of the Public Roads Administration, Thomas H. MacDonald, was responsible for the doctrine of the "mud tax." He declared that whether or not we have good roads, we have to pay for them; where we do not have them, we pay for them through the "mud tax." However much the

"mud tax" is concealed, it is nevertheless very real, and especially so in Central America where the seasonal rains for more than half the year make transportation over the trails and unimproved wagon roads extremely costly. In most of the countries, the customary modes of transport have been the carrier and the bullock.

The carrier, strong of back and long on endurance, is not individually expensive, but such transportation is slow and uncertain. In Guatemala, it was found to be only slightly cheaper than transportation by electric railroad. In fact, the story is told that when the electric road from Retalhuleu to Quezaltenango was first put into operation it competed successfully with the carrier. However, when sections were washed out during the rainy season and heavy maintenance charges were incurred, the carriers again came into their own and fear of competition prevented the reconstruction of the railroad.

The carrier jogs along for 2 days with one bag of coffee, at 20 cents a day, where the railroad would make the trip in 2 or 3 hours. The bullock hauls from 12 to 15 sacks at 10 cents a sack, and consumes a long day for the same trip. With the construction of public highways and with modern truck transportation, the time of the railroad can be met and the costs greatly reduced. This would bring the "mud tax" to the surface and should make it a productive rather than a nonproductive tax since money now being spent for inefficient transportation will be diverted to the construction of new internal roads to supplement the Pan American Highway.

Such a development would repeat what has been a common experience in almost every agricultural area in the United States, and would result in much the same improvement throughout the countries of Central America that has resulted in our own country. The construction of a main traffic artery is the first necessary step toward the development of adequate highway systems.

After all, the justification for internal improvements, whether they be waterways, railways, highways, sewers, waterworks, or public buildings, flows from their effectiveness in raising the standard of living. Most communities frequently turn to the less productive of such public works as the first desired step in this process. This is particularly true in Latin

The Old Road In Transition To The New



Brazilian Information Bureau Photo.

Carrying carnaúba on muleback.



At work on the new highway.



Bureau of Public Roads Photos

A modern highway for trucks.

America, where fine public buildings are numerous and imposing in surroundings often unsanitary, unsupplied with potable water, and isolated. Nevertheless, the demonstration of road-building throughout Central America south of Mexico during the last 8 years, the activities of the Rockefeller Institute, and the increasing interest in sanitation and public health have indicated a steady urge toward the development of other and more effective public works.

By facilitating better international communications and the exchange of staple agricultural products and by reducing the cost of internal transportation in each of the countries, road building is sure to play an important part in the future development of all the countries mentioned. The construction of the highway will open new areas to development and encourage the diversification of agriculture by making it possible to produce new money crops and export them to advantage. In turn new consumer demands will be created, imports will be increased, and the standard of living will be raised. Better nourished people will be better contented, and contented people will be politically more stable.

These simple things are being more and more realized throughout Central America and activi-

ties surrounding the building of the Pan American Highway have played a large part in developing this realization.

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LITERATURE ABOUT THE PAN AMERICAN HIGHWAY

For those interested in more information about the Pan American Highway, there is a good deal of literature available in the form of publications and magazine articles.

The official government report on the highway is entitled "Proposed Inter-American Highway." Prepared by the Bureau of Public Roads and presented to Congress in 1934, it was published as Senate Document No. 224, 73d Congress, 2d Session, and consists of 152 printed pages, with photographs and maps. It deals only with the Central American portion of the route, which is properly designated as the Inter-American Highway. The book is available from the Superintendent of Documents at 70 cents a copy.

Two books in popular format describing the highway have been issued in recent years. One

of these is "The Pan American Highway," by Harry A. Frauck and Herbert S. Lanks, who combined the experiences of separate trips they made over the route. It is illustrated with photographs and was published in 1939 by D. Appleton-Century Company, New York. Available in many libraries.

"Carretera Panamericana" is the title of a book in Spanish by Carlos Anesi of the Argentine, who compiled information about the route from many sources. It was published in 1938 in Buenos Aires and is probably available in the larger libraries.

E. W. James, author of the foregoing article, is also the author of a series of articles about the highway, which appeared from March to October, 1939, in "Ingeniería Internacional," engineering magazine published in Spanish by the Business Publishers' International Corporation, New York City. All the articles, in English, have been issued in a single pamphlet by the publisher.

Maps of the route in both Central and South America and a 4-page descriptive folder, "The Pan American Highway—Artery of Commerce, Peace and Defense," are available free of charge from the Pan American Highway Confederation, Pan American Union, Washington.

The Bulletin of the Pan American Union, available from the Union's Washington headquarters, has published several articles about the highway and plans more. Among them are: "Across the Andes from the Caribbean to the Pacific," by Beatrice Newhall, which appeared in three parts in the issues of June and August, 1937, and June, 1938; and "The Inter-American Highway," by Herbert C. Lanks, December, 1938.

Free exhibit space has been allotted to United States firms which participate in the Grand Exposition of American Products, opening August 10 in Quito, Ecuador.

The Government of Venezuela has offered 4,000 acres of agricultural land for the establishment of an Inter-American Institute of Tropical Agriculture in Venezuela.

In response to student requests, Valparaiso University of Valparaiso, Ind., will begin two courses next fall in the history and culture of Latin America.



U. S. Engineers helped build this Pan American Highway bridge across the Tamasalupa River in Guatemala.

MEET THE TONKA BEAN

by EDGAR R. BURKLAND

HOW will you have your coumarine? In the woody fragrance of a burning cigarette, the delicate scent of a perfumed soap, or the piquant flavor of an after-dinner liqueur?

You'll find it in all those forms and more, for it is a versatile product, this coumarine, which is extracted from the tonka bean of South America. It is one of the many tropical products which Latin America contributes to the agricultural abundance of the Western Hemisphere.

Strictly speaking, the tonka bean isn't a bean in the ordinary sense but a spice—the seed of a fruit produced by a tropical tree which grows wild in the northern part of South America. In scientific language, the tree is the *Dipteryx odorata*. The natives call it the *sarrapia*, which they apply to the tree, the fruit, or the bean.

The tree is a big one that often reaches a height of 100 feet or more. In the forest it is distinctive because of the yellowish color of its bark and its brilliant, thick, dark-green foliage. It ordinarily does not grow in solid stands, but occasionally it is found in small clumps known locally as *sarrapiales*.

Large as the tree is, the fruit it produces is small, considerably smaller than the mango of tropical America and about the size of the plum of the United States. In its early stages this fruit is a dark green. As it reaches maturity, it turns yellow and, finally, to a mahogany color.

The pulp of the fruit is extremely fibrous and about the same color as the rind. Some varieties have a taste which is not unpleasant and are sometimes eaten by domestic livestock and wild animals and fowl, although they appear to have no particular feed value.

That brings us back to the tonka bean itself, which grows within the mahogany-colored fruit and is surrounded by a hard shell, much like the kernel in a plum or peach stone. When the fruit is ripe, it falls to the ground and must be gathered quickly to avoid germination that would spoil the seeds.

The tonka bean harvest comes in January, February and March, and it is a time of almost festival excitement for the native workers, called

sarrapieros, who gather the fruit. Entire families often engage in the work—wandering about from place to place in the forest areas where the trees are found in the largest numbers.

A party arriving at a center of gathering operations first builds *ranchos* (huts) in which to house its members for two or three months. If the fruit has commenced to fall, collecting begins at once; if not, the men wander about the forest noting the spots where fruit is plentiful.



Tonka beans, with a cigarette for size comparison.

for earnings depend on the amount of fruit gathered, and the skilled *sarrapiero* must know every tree in his area.

At daybreak the work commences, the workers separating so that no fruit-bearing tree may be overlooked. After the trees in the immediate vicinity of the *ranchos* have been exhausted, the gatherers wander farther into the forest. Often they travel considerable distances and remain away from headquarters 2 weeks or more, sleeping in the forest in hammocks swung between trees with a covering of plaintain leaves or palm branches to protect them from the rain.

All the work of removing the hard shell of

(Continued on p. 10)

A Mid-West Town Goes Pan American

GREENFIELD, IOWA, went "all out" with its observance of Pan American Day, April 14. A town of 1,800 in the rural heart of the United States, Greenfield led the way in bringing home to the people of the middle west the true meaning of Pan Americanism. More than 10,000 persons came from miles around for the celebration. Everybody took part—merchants, women's clubs, school children, farmers. Spanish-costumed Iowans addressed each other in simple Spanish phrases. On these pages are some pictures showing how Greenfield folk enjoyed the day.



(LEFT) Dr. Luis Quintanilla, Minister Plenipotentiary and Counselor of the Mexican Embassy in Washington, was the principal speaker of the day, took part in a Nation-wide broadcast that originated in Greenfield. The Carnegie Endowment for International Peace made his visit possible.

(BELOW, LEFT) The town, the crowd and the parade, which was a mile long. (Inset) A boy and a hat.





Pavement dancers in Spanish costumes didn't mind chilly weather.



Four Greenfield girls in festive attire pose for an amateur photographer. Before the day was over, you could hardly buy a roll of film in town.



Greenfield merchants cooperated by displaying Latin American products, showing how U. S. depends on them. There were 50 window displays. (LEFT) Hemp in a hardware store. (RIGHT) Tin in a grocery.



(BELOW) During the afternoon, there was a varied program. These women, singing Latin American songs, were among the entertainers. There was also a Pan American pageant.

All photos by Harmon, A. A. A.



the seed is done by hand by the *sarrapieros* with the use of rudimentary tools such as rocks and hammers. This is done in an open spot in the forest, where the fruit is taken after a sufficient quantity has been gathered. The beans are carefully removed from their shells and spread out to dry for 2 or 3 days, often on the large masses of granite which are characteristic features of many forest regions. After being dried, the beans are bagged and delivered, usually by boats or large canoes, to merchants in the larger population centers.

Ready for a Rum Bath

At this stage in their journey from forest to market, the beans are ready for the novel experience of a rum bath, since before they can be accepted in markets abroad they must undergo a process known as crystallization by being immersed in alcohol.

In Venezuela, the principal exporting nation, this is usually done at the business place of the merchant to whom the beans are delivered. The beans are soaked in barrels of strong rum for several days. When the liquid is drained off, the beans remain tightly packed in the barrel, ready for export shipment. The beans are none the worse for the experience. On the contrary, as a result of the immersion, they are soon coated with a white crystalline deposit of coumarine, which is the most important constituent of the bean.

When they are shipped, the beans, as will be seen by the illustration accompanying this article, are about an inch and a half long and have a somewhat wrinkled surface. They are flecked with the coumarine deposit and have a penetrating, pleasant, rather spicy aroma.

Exact information about the commercial uses of coumarine in the United States is difficult to obtain, since in most cases it goes into formulas which are closely guarded secrets of the manufacturers.

Perhaps the most important role played by the tonka bean in this country has been its use in the tobacco manufacturing industry—especially in the preparation of some brands of cigarettes. For this purpose the beans are thoroughly ground and then given another soaking in rum, this time for about 3 months.

When the resulting liquid is drained off, it is rich in coumarine and is highly aromatic. Sprayed over tobacco in accordance with each manufacturer's own particular formula, it gives the finished product a distinctive fragrance.

The tonka bean, or more properly the coumarine extract, is also used in various kinds of flavoring. Having an aroma resembling vanilla, it is sometimes used as its substitute. It has some importance in the manufacture of soaps, perfumes, liqueurs, bakery products, and confectionery, and has been used in scenting snuff. One of the most important uses claimed for it is as a fixing agent in the making of coloring materials.

The tonka bean kernel also has a reputation for containing stimulating and anti-convulsive properties as a medicine for the treatment of debility, vertigo, and nausea.

The bulk of tonka beans of commerce, as already stated, come from the tree *Dipteryx odorata*, oftentimes in the past referred to by the name *Coumarouna*. More than one species of *Dipteryx* provides beans for the market. Perhaps the most important variety is that known locally as *Angostura*, which is found growing in the regions of the *llanos* (grassy level plains) of Venezuela, Colombia, Brazil, and the Guianas.

Although almost all tonka beans produced in the past have come from wild trees, plantation cultivation has been tried with considerable success on the British Island of Trinidad, off the coast of Venezuela. The tree is tropical, hardy, and quite resistant to excess moisture and droughts. Notwithstanding its hardihood, however, it seems to prefer a loose soil with a layer of vegetable matter containing a fair amount of humus. For this reason, trees are often found along the shores of rivers or on flood lands. Trees growing in sandy clay soils have been found to yield very good crops. It is generally believed that tonka bean trees will grow quite well in most regions of average rainfall in Venezuela and Colombia, where the elevation is not too high and where the land is of reasonably good quality.

Under cultivation, tonka bean trees often begin to bear in small quantities when only 18 months old, and when only 3 years old begin to bear good crops more or less regularly. One of

the peculiar characteristics of the tree is its irregularity of crop production. Young and old trees tend to produce good crops biennially or triennially. The yield per tree varies greatly and depends on several factors, such as soil, age, variety, and care in cultivation. A fair average is probably 2 or 3 pounds per tree each year, although records show that isolated trees have produced from 50 to 100 pounds of beans in a single season.

From one-half to nearly all United States imports of tonka beans in the past have originated in Venezuela, reaching this country by way of Trinidad, where until 2 or 3 years ago most of the crystallization was done. Practically all the rest of our imports come from Brazil and Colombia. The largest amount imported during the last 10 years was 745,000 pounds, valued at about \$770,000, in 1936. After the beans are crystallized abroad, they sell on the New York market for about \$1.60 a pound.

While it is not one of the major products of tropical America, the tonka bean is of consid-

erable importance in certain areas, where it is the basis of an established industry. Several problems confront this industry.

One reason why our imports are no larger is that the uncertainty of the supply resulting from irregular yields and forest production has led to use in the United States industry of synthetic coumarine. Indications are that this product is more expensive and no more satisfactory than the natural product and would not be so widely used if a steady supply from South America could be relied upon. There are many who believe that scientific study of the tonka bean would add new uses to the present list. It might prove to be a valuable substitute for the numerous aromatic products from which the United States is cut off by the world emergency.

Before any very definite forecasts of the future can be made, it will be necessary to determine whether or not irregularity of crop production can be overcome under plantation conditions and to define just what place the tonka bean is to occupy in industry.

U. S., Haiti Plan Rubber Production

A long step toward establishment in the Western Hemisphere of a source of rubber supply was taken early in May, when the Governments of the United States and Haiti jointly announced agreement in principle on a long-term program of cooperation in the development of Haitian agriculture and economy.

A central feature of this program is a broad plan of rubber developments. This is based on surveys of information gathered by the U. S. Department of Agriculture, which has already established breeding gardens and an experiment station for rubber plants in Haiti.

Less than a year ago, the U. S. Department of Agriculture started, in cooperation with Tropical Latin American countries, to reestablish rubber in the Western Hemisphere, thus reviving a formerly substantial Latin American industry and relieving the Hemisphere of its dependence

on rubber sources thousands of miles away. Officials view the new Haitian agreement as the most encouraging development to date.

The Haitian program also includes an increase in banana plantings; the planting of oil crops, spices, drug plants, food plants, and fiber plants; cacao improvement; the development of Haitian forestry resources; and the stimulation of small handicraft industries. The development will begin at carefully selected central plantations from which a small-grower industry may be stimulated and directed, with the United States providing technical information and assistance.

Discussions which led to the agreement for the joint program were conducted between the appropriate agencies of the United States Government and His Excellency Elie Lescot just before the latter's inauguration as President of the Republic of Haiti.

CHANGING TIMES IN CHILE

by MANUEL VEGA

CHILE has been chiefly an agricultural country for many years. We have lived, really, from what the land gave us.

The great majority of the old Chilean fortunes did not spring suddenly from land speculation nor from investment in booming industries. They were accumulated, patiently and honorably, by men who dedicated themselves entirely to the work of agriculture.

The old landlord of our farms was a sort of father to the men working under his orders. The work routine was a familiar one. No symp-

Manuel Vega, author of this article, is a leading Chilean journalist, literary editor of *El Diario Ilustrado* in Santiago, Chile. He is one of seven Chilean newspapermen who served on United States newspapers for two months this year under a cooperative plan arranged by Claude G. Bowers, American Ambassador to Chile. While in the United States, Señor Vega served on the staff of the *Washington Star*. He and the other visiting journalists arrived in this country in February and returned home early in May, closing their visit with a nationwide trip. Señor Vega was educated in the Instituto Nacional of Santiago and, through his work with *El Diario Ilustrado*, has become established as one of Chile's leading contemporary writers.



toms of the class struggle had penetrated to Chile's farming areas, where the land still retained its natural beauty. Between the landowners and the workers were neither written obligations nor social laws, except as they existed in deep human understanding on both sides.

This system was not progressive in the sense in which the word is used today. That is, it did not make for industrial development nor for widespread land ownership. But these were other times, and they can scarcely be judged by the standards of today.

Most of Chile's agricultural wealth is produced in Valle Central—that great 800-mile

Central Valley between the Andes and the Pacific, where soil is fertile, climate is temperate, and rainfall is ample. It has long been an area of *fundos* (large estates), which had their origin in grants established in favor of some patriarchal families by the Spanish monarchy in the days before the country won its freedom from the Spanish crown. Large tracts of land came under control of the few and remained with them for many decades. With the passing of years, however, the land has been distributed, and the farms of the old Chileans have been slowly disappearing.

The development of nitrate in Chile is one of the most important factors in this agricultural change. For almost 300 years after Europeans first came to Chile, the great desert along the northern seacoast of the country was regarded as useless to the human family. Exports of nitrate did not begin until early in the nineteenth century. In the 1830's, after Chile's victory in the War of the Pacific, the desert, once ignored, became the prime economic power in Chile as the source of almost the world's entire supply of natural nitrate. Then, for the first time, began the industrialization of my country.

In that industrial boom, fortune did not always smile on the traditional landowners who since colonial times had been the dominant force in the country. As fortunes changed, so customs and traditions changed—almost overnight.

The nitrate mines brought to the people on the farms for the first time the temptation of cash wages. As the great urban centers grew, Chileans began to lose their affection for the land and its products. In more recent years, the steadily rising day wage of industry provided an additional temptation to those still living and working on the *fundos* of Valle Central.

It appears, too, that few of the descendants of the old landowners inherited the spirit of enterprise and sacrifice of their forebears. It was easier and more pleasant to spend the money accumulated by others in trips de luxe to Europe, or even to mortgage their land for this purpose. Life was lived for today, with little

thought to preventing the frequent depressions and with many complaints about them when they occurred.

But, because no work demands so much personal dedication as farming, the land is always loyal to those who cultivate it and who show equal loyalty in turn. And the land has been loyal to Chile.

In our time much is heard of the industrialization of Chile. We are justly proud of it. But there are new economic currents abroad in the world. Chile's nitrate has found new competition in the artificial product, and expansion of this industry has been halted, at least for the present. Our currency has dropped in value. Out of it all may come renewed dependence on the land, on which the Chilean nation was founded.

Any story about Chilean agriculture must include mention of the work that has been and is being accomplished by the National Society of Agriculture of Santiago, and similar societies in the north and south of Chile, which may be considered outgrowths of it.

The National Society of Agriculture was founded in 1838, for the purpose of aiding agriculture and related industries. Now, after 103 years of existence, it is a strong organization which conducts this program adequately and efficiently. Among its activities are the Biological Institute, which investigates cattle diseases and furnishes farmers with serums, vaccines, and other veterinary medicines; the Experiment Section, which carries out experiments with seeds, tests new farm machinery, and is interested in the use of fertilizers; the Section of Aviculture, employed especially in the care and feeding of poultry; and the Wine Section, which in special laboratories analyzes the condition of wines and also endeavors to market these products. These are its technical services.

Among its general services should be mentioned, as all important, the Cattle Section. Its duty, since 1869, has been the management of the Agricultural Exposition which is held annually, toward the end of Spring, in the Quinta Normal de Santiago. This exposition starts off with an enormous midday meal which the President of the Republic ordinarily attends. Moreover, the Ministers of Agriculture of Peru and of the Argentine and the principal officials of



Photo by Cori, Chile.

Society of Agriculture Building, Santiago, Chile.

similar agricultural societies in such friendly countries have come to the exposition in late years as specially invited guests. These are not merely courtesy visits of simple protocol, but real missions of exchange and agricultural understanding between Chile and other countries of the continent. We have problems in common whose solution none of us can work out alone.

The Bulletin Section publishes an interesting monthly review, entitled "El Campesino" (Country Gentleman), and the Propaganda and Broadcasting Section maintains a splendid information service on market prices, weather conditions and stock market quotations. Its general daily broadcasts usually include music, discussion and even humorous dialogues. It would seem that the voice of the National Society of Agriculture is one well worth being listened to throughout all the Americas.

Almost every enterprise, even though it is the result of collective effort, requires a leader as its inspiration, a man to enliven it, who believes wholeheartedly in the worth of the enterprise and whose energy pushes it forward. Undoubtedly, the ever-increasing prestige of the

National Society of Agriculture of late years is in great part a result of the persevering efforts, the talent and the executive ability of Jaime Larrain. This dynamic statesman, young and affable, is thoroughly in step with the times. An experienced farmer, he knows the problems of the land, its greatness and its misery as well, and the needs of the men who work the soil. Five years he was the President of the National Agricultural Society. Recently he resigned. It was a sorrow to all the farmers of Brazil, but, thanks to the example he set, the good work will go on.

In La Serena, we have the Agricultural Society of the North, which publishes "The Agriculturist of the North"; in the south, the Agricultural Society of the South in Concepción, and the Agricultural and Cattle Society of Osorno. Because of our great territory, diversity of climate, and the variety of products cultivated in different regions, complete centralization is not possible, but all three agricultural societies are closely coordinated.

The work of the National Society of Agriculture has given to Chilean agricultural work scientific methods and modernity which it once lacked. In bygone days, every farmer was out for himself, without any connection with his colleagues, and, often, without considering market demand or internal consumption. At that time almost absolute individualism predominated. In no area was there an effort to stimulate the yield of crops, as has long been common in other countries. Nothing was asked of the land, but what the soil wished to give. Chile naturally suffered from constant variations in crop yields and production. The farmer sowed in accord with the results of his preceding crop, hoping for better crops and sometimes changing, without any particular planning, the cultivation of his fields. As a result some years saw a shortage of flour, not even enough for home consumption; in other years an over-abundant supply would send prices tumbling.

Modern methods are changing all that. Farmers are fertilizing their fields. They are sowing with an eye to markets. So-called "bad" years and "good" years are less frequent. The extraordinary depressions of earlier periods are avoided. Chilean agriculture today finds itself in full flower.

Fourteen years ago a Ministry of Agriculture



Photo by Cori, Chile.

Rodeo in Chile.

was set up as a branch of the central government. Since then have come the Agricultural Exports Board and other official departments. All have helped enormously to bring closer together all the agricultural activities of my country, to give them organization, to bring about increased plantings and production, and to avoid, as much as possible, periodical depressions which influence the general economy of the country. Moreover, there are organizations whose aim is to better the lot of agricultural workers, a work which also has its cultural side. This is being accomplished in part through the publication called "The Book of the Chilean Countryman," edited by the Ministry of Agriculture and distributed without charge in the country.

Have we, with all this, solved our agricultural problems? Undoubtedly "no." We have yet some road to travel! We must, for example, look a little more in the direction of the United States and the excellent agencies which in this country direct and coordinate the agricultural production of the United States. Without a

AGRICULTURAL FRONT

BRAZIL RECLAIMS SWAMPS

The Fluminense Lowlands, a network of valleys and marshes extending up and down the coast around Rio de Janeiro, once were abandoned by the population in the losing struggle for existence. Today, this area promises to be one of the most prosperous producing centers in Brazil.

For many years the Fluminense Lowlands were inundated by flood waters from the coastal mountains and by stagnant sea waters washed over the low land by high tides. The area had receded into a stage of unproductiveness, unhealthiness, and, finally, desertion. Jungles and swamps invaded the territory.

Sporadic but unsuccessful attempts to reclaim this region have been made since 1891, but the area continued in decadence. In 1935, however, the Brazilian Government inaugurated a 10-year land reclamation project, the total cost of which will be more than \$6,000,000. Work on the project includes: 1. Reclamation of areas invaded by tides at flood; 2. protection against floods; 3. dredging up new beds for rivers that were transferred into marshes; 4. definite joining of coastal lagoons with the ocean; 5. under-

ground drainage of certain areas; and 6, masonry work.

This project has progressed rapidly and the results already obtained have been very satisfactory. It is anticipated that the region will be completely reclaimed by 1945 or 1946, the date set for completion of the project. The land once more will be restored to its original state of luxuriant plains of immense riches and will provide a breadbasket for the residents of Rio de Janeiro.

EXTENSION LEADERS VISIT MEXICO

Notes on methods of agricultural education and research in two American republics were compared early in April, when a group of leaders from the U. S. Extension Service met with Mexican agricultural leaders at Saltillo, Coahuila, Mexico.

More than 700 Mexicans attended a dinner in honor of the visitors, and even more attended a meeting at which Reuben Brigham, assistant director of the Extension Service, spoke for the U. S. delegation, extending greetings from President Roosevelt, Secretary Wickard, and agricultural workers in this country. Attending

(Continued on p. 16)

doubt, it would be very helpful if North American technicians on missions of investigation should go to Chile to look over the condition of our soil and ascertain the possibilities of Chilean agriculture, so that they might show us what changes are necessary.

The land of Chile is generous, especially in the Valle Central and in the southern region. It produces wheat in abundance, vegetables pleasing to the palate, rich fruits, and a great variety of grapes. The latter have made our wines really desirable beverages and there are some who consider, perhaps with undue optimism, that Chilean wines compare favorably with French wines.

There remains one other big problem to solve: What to do about exports. Up to the outbreak

of the present European war, Germany had been buying almost all our agricultural exports, especially leguminous stuffs. We have lost this market, and, unfortunately, it does not seem an easy thing to replace it with some other country.

Anything that endangers the market for our farm products endangers the real Chile, for the very life of my country is rooted in the soil. What would become of our "*huasos*" (farm hands) if the day should come when they were unable to celebrate their traditional rodeos, beneath the shade of willows, beside singing rivers, with their music? Those things are the genuine expression of the Chilean popular spirit. The people of Chile must be encouraged to keep their interest in the land and its cultivation, so that that spirit may be preserved!

from the United States were Mr. Brigham and Charles Sheffield of the Federal Service and Extension Directors from 10 southern States.

MEXICAN OIL FOR CUBAN SUGAR

To counteract the sugar shortage in Mexico, the government has arranged to obtain sugar from Cuba in exchange for Mexican oil. The first consignment of 1,000 tons, already shipped to Vera Cruz, has been distributed.

SISAL PLANTINGS SATISFACTORY

Results obtained with experimental plantings of sisal in the State of São Paulo, Brazil, have been satisfactory. Production of fiber during 1940 has been set at approximately 265,000 pounds, all of which was consumed by local cordage industries. The number of sisal plants which have already reached the production stage is 330,000.

"MINOR" INDUSTRY FLOURISHES

Canning tomato products is one of the outstanding minor industries developed in Argentina in recent years.

Since transportation costs preclude the possibility of exporting canned tomato products to the United States at the present time, exporters are largely confining their efforts to promote trade to Paraguay, Brazil, and the British market.

TUNGSTEN FROM BOLIVIA

The United States, through the Metals Reserve Company, has completed arrangements for purchase of Bolivia's entire output of wolfram ore (source of tungsten) for at least the next three years.

Tungsten, listed as a "strategic" commodity by the United States Army, is vital in manufacturing machine tools and filaments for electric bulbs and radio tubes. Japan has previously absorbed a large share of Bolivian tungsten. Most of the United States supply has come from China.

SHARK FISHERIES IN ECUADOR

The United States is planning to establish large shark fisheries on the Ecuadorian coast in order to obtain a special lubricating oil needed for the high-speed machine industry. The oil-bearing livers of the fish will be preserved and processed in the United States.

NEW ORANGE JUICE INDUSTRY

A factory has been established at Taubate, State of São Paulo, Brazil, to produce concentrated orange juice. Special attention will be given to byproducts from the skin and pulp.

Although domestic consumption has somewhat counterbalanced the loss of orange exports in Brazil, the European conflict has had a serious effect on the orange industry. It is expected that this new orange juice industry will create a new outlet for orange growers in São Paulo.

PERMANENT LATIN AMERICAN INSTITUTE

The University of Texas has focused the attention of two continents on its campus by opening a permanent Institute of Latin American Studies.

The general objective of the Institute is to give students of this country an opportunity to obtain through unified and correlated programs of study an intelligent understanding and appreciation of the culture of our neighbors south of the Rio Grande. At the same time, it gives Latin American students an opportunity to plan their Latin American cultural studies in line with the general good will program of the United States.

Inauguration of this Institute was prompted by the growing interest throughout the country in Latin American relations. The University decided to crystallize that interest into an active, potent force by promoting Pan American understanding.

RODOLFO MICHELS—*Our Mutual Friend*

Two Americas — North and South — are blended in Rodolfo Michels, highest diplomatic representative in the United States of nitrate-mining, seafaring Chile. His father was Charles E. Michels, engineer from the United States who for many years was connected with mining organizations in Chile. His mother was Cristina Cabero Michels. Typical of cosmopolitan Chile is this combination of North and South American blood.

Since December, 1940, Mr. Michels has been Ambassador Extraordinary and Plenipotentiary of the Republic of Chile in Washington, accepting the appointment following a distinguished public career in his own country.

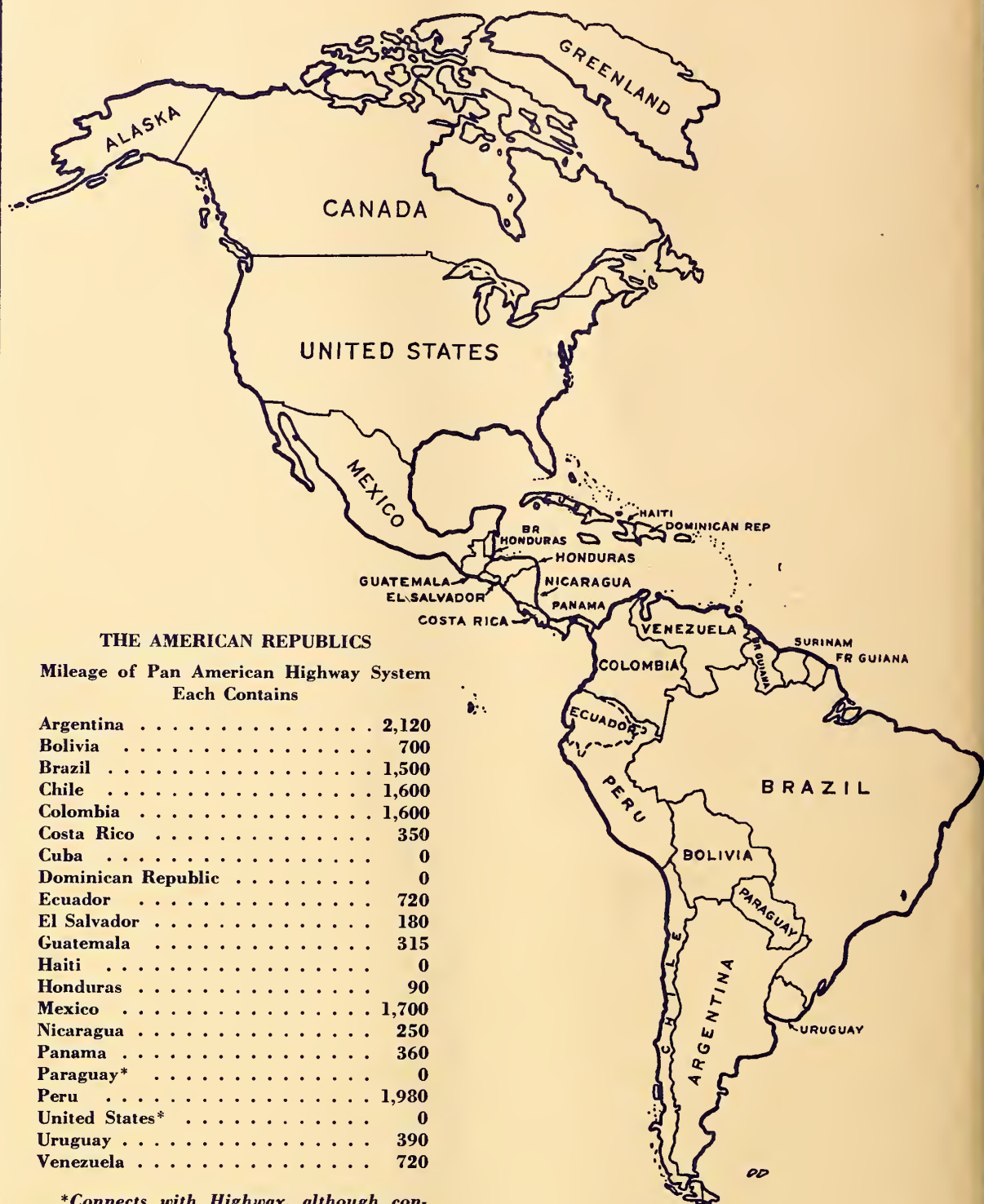
Born in Santiago in 1895, Mr. Michels followed his father in mining activities. As a mining engineer, he learned thoroughly the mountain country of South America, spending months camping out and on horseback in the Bolivian and Chilean mountains, enduring discomforts and hardships that left him deeply sympathetic with the problems of the people of his mountainous native land.

Out of this phase of his life grew what has become both a life work and the Ambassador's only hobby — the close study and observation of the social, political, and economic problems of the Western Hemisphere and of the world.

With this background and these interests, it was natural that Mr. Michels should enter public life. In 1923, he was elected to the Chamber of Deputies of Chile, where he served for 10 years. In 1933, he was elected to the Chilean Senate from the Provinces of Atacama and Coquimbo in the nitrate region along the rugged coast of northern Chile. When he resigned his Senatorship last year to transfer his talents to the international field, his diplomatic appointment was unanimously approved by his fellow-Senators.

The Ambassador is the author of many economic and mining laws, passed during his terms in the Chilean Congress. He was a member of the Budget and Financial Committee and Chairman of the Mines and Industrial Enterprises Committee of the Senate. He also served as a Director of the Mining Credit Bank, the National Mining Society, and the State Munitions Factory.

In both personality and experience, he is ideally fitted to represent his country in diplomatic circles. Because he likes to travel, he has visited every one of the 21 American Republics; and, because he is a good mixer, likes to entertain, and enjoys intelligent conversation, his acquaintance in the Western Hemisphere is wide. On two occasions he has represented his country at functions where Hemisphere solidarity was much to the fore. In 1939, he was Chile's Commissioner General to the New York World's Fair. In 1940, he served as a Plenipotentiary Delegate to the Havana Conference of the American Republics, at which inter-American cooperation was pledged.



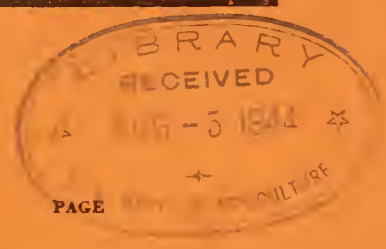
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Agriculture *Americas*

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By President Elie Lescot

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July 1941

OFFICE OF FOREIGN AGRICULTURAL RELATIONS
UNITED STATES DEPARTMENT OF AGRICULTURE

A Word From Haiti . . .

When I returned to Port-au-Prince early in May to assume the office of President, with which my fellow-countrymen have honored me, I was able to bring word to the people of Haiti of one of the most far-reaching economic steps in our national history. I was able to tell them that the farmers of Haiti (and most of us are farmers) were henceforth to enjoy the fullest possible degree of agricultural cooperation with the United States.

The long-term program announced jointly by our two Governments on May 6, 1941, will affect most of the agricultural products that can be grown in Haiti. We will become less dependent on the few staple crops that have long formed the basis of our economy. Henceforth we will produce more of the deficit products of the Western Hemisphere, which are now imported from distant lands.

What have we Haitians to give in return for this cooperation? We have, for one thing, a potentially large market for the manufactured goods and the processed agricultural products of the United States. We are buying now only a small fraction of the clothing, the machinery, the flour, and the lard that we would use if we could afford them.

But we have more than a market to offer. We have the friendship and good will of 3,000,000 souls who love freedom so much that they would die to defend it—as their ancestors died in the war for Haitian independence.

Haiti has been an independent nation longer than any other in the Western Hemisphere except the United States. It is a nation of small farmers who own their own land. We of Haiti are not rich in material things but we prize our freedom, our independence, and our way of living. We believe we are defending that freedom and that independence when we cooperate with the United States in the defense of the Western Hemisphere. We are proud of our role in showing the world that the Good Neighbor Policy means Democracy in Action.



ELIE LESCOT,
President of Haiti



American Ambrosia

Photo by Foto-Almacen Lindner, Bogotá.

by WILSON POPENOE

“IT IS the Queen of Fruits. It is like nectar and ambrosia.”

Thus, three hundred years ago, the mango-steen was lauded by Jacobus Bontius, the Dutch botanist, who combined epicurean tastes and a flair for poetic language with his scientific knowledge.

Although the mangosteen is grown in the American tropics, it is a stranger to most North Americans. There are dozens of other tropical fruits, just as little known, that all through his-

For information about the author, see “Wilson Popenoe—Our Mutual Friend,” inside back cover.

tory have been launching gourmets into paeans of praise.

Not all of these delicious fruits are native to the Americas, but all of them can be produced here. Our tardiness in bringing some of them

to the Western Hemisphere can in part be blamed on early-day difficulties in transporting delicate seeds and seedling trees long distances by water.

A century ago, in fact, shipment by ordinary means was so nearly hopeless that when the British government decided to introduce the breadfruit tree from the South Pacific into the West Indies, it sent out a special expedition for the purpose. That expedition produced one of the most famous sea journeys of all time, the voyage of the *Bounty*. Mutiny became the principal deck sport on the trip, which in recent years has been popularized in print and on the screen.

In these days of air express, no Captain Bligh, no voyage of the *Bounty* would be necessary to bring the breadfruit from Tahiti to Jamaica. That barrier to expansion of the tropical fruit industry has definitely been removed.

There is, of course, no great demand in northern markets for the less known tropical fruits.

Education is changing the situation, however. A decade ago the avocado was almost as foreign to the North American dinner table as the snail. Today it is not even a luxury.

More and more tropical fruits are appearing in northern markets. More and more tropical horticulturists—and especially those in Latin America—are taking a keen practical interest in fruit culture. While only a few fruits bulk large in the commerce of the tropical Americas, the industry holds great possibilities.

* * *

Having traveled in the Tropics for a quarter of a century and having sampled, on their native heaths, where they taste best, practically all the tropical fruits that might tempt northern palates, I have made a selection of what I regard as the ten finest fruits produced in the warm regions of the globe. I don't mean merely the ones that taste best to me. To be both practical and frank, I mean the ten which should in the long run make cash registers tinkle most frequently in northern fruit markets.

There may be arguments about some of my selections, but on the basis of popularity in the Tropics and importance in world markets, I feel there can be no question about the standing of the orange, the pineapple, and the banana. The horticulturist who does not consider these time-honored favorites among the best tropical fruits is simply the only one in the parade who is out of step.

The orange, a native of the Asiatic Tropics, was brought to America by the Spaniards during the first years of the Conquest and is now grown everywhere in tropical America—not to mention the tremendous importance it has attained in such subtropical regions as California and Florida.

The pineapple, native to Brazil, is recognized both in the New World and the Old as one of the most delicious of tropical fruits. Strangely

enough, it has achieved its greatest commercial production importance not in the American Tropics but in the Hawaiian Islands.

The banana is believed to have originated in Malaya, but was brought to America at such an early date that there have been many who considered it native to this continent. Its popularity is attested by the fact that the Gros Michel banana is today probably the world's most important fruit variety from the standpoint of volume produced. There have been more than a hundred million bunches of this variety shipped in one year from tropical America to the markets of the North.

The other seven are of such interest to agriculturists in the Americas, and to consumers, present or potential, in both the temperate zones and the tropics, that they are worth discussion.

The Mango

Although the mango has not yet appeared in the markets of the north to the extent which its beauty, its delicacy of flavor, and its wholesomeness warrant, few residents of the Tropics will disagree with me in placing this fruit high in the list. The mango has, in fact, been aptly termed "the apple of the Tropics." Throughout the tropical regions of the world it is as popular as is the apple in the United States. Indeed there are many regions where it occupies an even more important role in the diet of the common people.

Originally from southern Asia, the mango was brought to the American Tropics in the eighteenth century and spread rapidly to all countries where conditions for its growth were suitable. Today it runs wild in many places. It is one of the commonest trees upon the mountainsides of Jamaica and upon the plains of Cuba. But it must be noted that these half-wild trees do not produce the best mangos, any more than seedling peaches produce high-class fruit in the North. The East Indians learned this many centuries ago, and set about improving the qual-



All fruit pictures by Bureau of Plant Industry

THE MANGO—“*Apple of the Tropics*”; about half actual size.

THE MANGOSTEEN—A poetic botanist called it “*Queen of Fruits*.” Snow-white segments that melt in the mouth please the most critical.

ity of the fruit through selection and grafting just as inhabitants of the temperate zone have improved their apples, peaches, and pears. The result is that today there are available to horticulturists in tropical America superior grafted varieties of the mango which leave little to be desired.

One of the best known is the Haden, which originated at Coconut Grove, Fla., as a seedling from the famous Mulgoba variety of India. Haden is a large mango, often weighing more than a pound. It is beautifully colored, orange-yellow to crimson-scarlet, and its quality is good, although its flavor is not quite so spicy and aromatic as that of certain others. Haden has proved to be one of the best mangos for shipping to distant markets, and the tree is more productive than that of some other varieties.

Julie, from the French West Indies, is another popular sort—now the favorite in several countries. While not so large nor so highly colored as Haden, the fruit is of even better eating quality and the tree is a good bearer. The Bombay mangos, such as Pairi, Borsha, and Amini, are among the finest of all in quality, but do not bear freely in wet climates. The Philippine group, which includes the well-known varieties Carabao and Cambodiana, are quite distinct in flavor and preferred by some

connoisseurs. There are many seedlings of this race in Mexico and Cuba, where they are known as *Mangos de Manila*, or *Filipinos*.

The Avocado

When Europeans first landed upon the shores of northern South America the Indians presented them with a fruit which Martin Fernandez de Enciso, a member of the party, described as having a flesh “like butter, and of such delicious taste that it is something marvelous.” A few years later Cortes and his followers came upon this same fruit in Mexico, where the Aztecs cultivated it in their gardens and called it *ahuacatl*. Later Pizarro saw it in Peru, where the Inca conqueror, Huayna Capac, had brought it from the mountains of Ecuador.

Strangely enough, this fruit, the avocado, unlike many other American products discovered by the Spaniards, has never become extensively grown in any part of the Old World: but from Mexico to Chile it is one of the popular food-stuffs. In recent years it has been planted commercially in Florida and California. Cuba exports as many as ten million pounds of avocados annually to the markets of the United States, while an even larger quantity is produced in California and Florida. The avocado is well

on its way to becoming an important commercial fruit.

Early in the seventeenth century, Fra Bernabe Cobo wrote that there were three kinds of avocados, one of which is grown in Mexico, and is small, with a thin skin, and flesh of very rich flavor; another in Guatemala, which is larger, and has a hard shell; and still another which is found in the West Indies and northern South America, and which is larger even than the Guatemalan, and has a thick but soft skin.

It is through studying these three races of avocados and their differences that avocado culture in the Americas has been expanded geographically and will be still further expanded with regard to the number of months during which the fruit is available in any given region. In Mexico, in Florida, and in California, crosses between these races produce new forms which are extremely valuable. The propagation of these forms by grafting insures uniformity of product and early fruiting.

Mexico, appropriately enough, has given the world its most important avocado varieties to date. One of them, the Fuerte, which originated at Atlixco in the State of Puebla, is now represented by more than a million trees in California alone. Guatemala has also furnished choice varieties, especially for subtropical regions, while Cuba has been the source of some of the best ones for the tropical lowlands.

Residents of Latin America have to take these three races into account when planning an avocado orchard. For subtropical regions, such as southern Peru and Chile, Argentina, southern Brazil, northern Mexico, and for high elevations in the Andes, Mexican varieties such as Puebla and Guatemalan varieties such as Benik, Nabal, and Nimlioh are good, as well as Guatemalan-Mexican crosses such as Fuerte. For lowlands in the Tropics proper the Mexican and Guatemalan varieties are not so well suited. Here it is best to plant West Indian varieties, such as Catalina, Simmonds, and Waldin; and to extend

the season of ripening of West Indian-Guatemalan crosses, such as Lula, Collinred, and Fuchs.

The Mangosteen

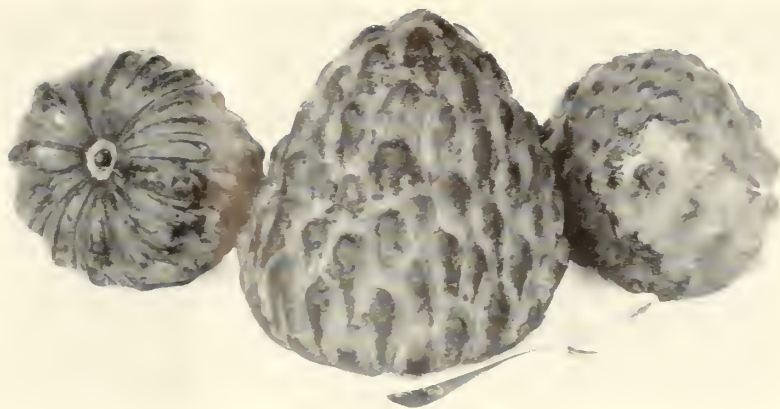
Few, I think, can dispute the claim of the avocado to a place among the ten best fruits of the Tropics. None can dispute the right of the mangosteen. The same Jacobus Bontius who compared it to nectar and ambrosia said that it surpassed the golden apples of the Hesperides and was "of all the fruits of the Indies by far the most delicious."

Why, then, has the mangosteen not become well known in the American Tropics? For the lamentable fact remains that it is *not* well known. I question that there are today a thousand people in all that region who have tasted this fruit.

The answer probably lies in the perishable nature of mangosteen seeds and the delicate nature of the tree during the first years of its life. Air express and a better horticultural technique have removed these obstacles, and there is every reason to expect that the mangosteen will be grown widely throughout Latin America before too many years have passed. Already there are scattered trees in the West Indies and Central America, and a few in South America, not to mention a grove of more than 600 in Honduras, another of considerable size in Panama, and a small one in Ecuador.

The mangosteen needs a tropical climate and good soil. Given these requirements, it really is not hard to grow. But it is slow. Usually the trees do not come into bearing until they are 7 or 8 years old—although some have done better in Panama. It is a beautiful thing, with large, glossy, dark-green leaves which give it a highly ornamental appearance.

The fruit is the size and shape of a mandarin orange, smooth and dark purple on the outside, and adorned at the stem end with the four green segments of the large calyx. The rind is



THE GUANABANA—A favorite in Cuba. Some people call it the soursop.

THE CHERIMOYA—Missouri's Mark Twain recommends this one. The best ones grow high on the slopes of the Andes Mountains.

thick and must be cut with a knife. Within, lying loosely in a red-purple cup, are five or six snow white segments of flesh which, when lifted into the mouth, melt almost imperceptibly, leaving the most delicate flavor on the palate—something like that of a very fine plum, if it is possible to make any comparison at all. Some tropical fruits meet an indifferent reception from strangers, but I have yet to see anyone who did not like the mangosteen on first trial.

The Cherimoya

"The pineapple, the mangosteen, and the cherimoya," wrote the great botanist Seemann, "are considered the finest fruits in the world. I have tasted them in those localities in which they are supposed to attain their highest perfection—the pineapple in Guayaquil, the mangosteen in the Indian Archipelago, and the cherimoya on the slopes of the Andes—and if I were called upon to act the part of a Paris I would without hesitation assign the apple to the cherimoya. Its taste, indeed, surpasses that of every other fruit, and Hainke was quite right when he called it the masterpiece of Nature."

There are many people, undoubtedly, who will not agree with this enthusiastic description of the cherimoya. Some of these have perhaps eaten it in regions too warm for the fruit to de-

velop its perfect flavor—for it is a notorious fact that the cherimoya is good only when grown at high elevation in the Tropics, or in subtropical regions where the weather is relatively cool.

Mark Twain, who certainly was not prejudiced in favor of tropical fruits, but who ate it in Madeira where the climate is right, called it "deliciousness itself."

Though originally grown only in the Andean region of southern Ecuador and northern Peru, where it is indigenous, the cherimoya was carried by the Spaniards at an early day to other parts of tropical America, especially Mexico, where it is now a common fruit in many of the highland regions. Little has been done to improve the wild forms. Little can be done, perhaps, so far as flavor is concerned, but they often contain many seeds and it will certainly be possible to obtain through selection varieties which bear more freely than many of the present-day trees.

The Lychee

If the Old World has been slow to appreciate the merits of one of the choicest horticultural products of the New—the avocado—it can fairly be said that the New World has been even more slow to realize the value of that great fruit of southern China, the lychee. Chinese residents



THE LYCHEE—You may have tasted these in a Chinese restaurant.



THE SAPODILLA—No. 10 on the Popenoe list, but a Spanish royal envoy once called it "the best of all fruits."

of tropical America often comment on this fact. To them, the lychee is one of the world's best fruits. At Canton, in southern China, it is the popular verdict that this fruit is superior both to the orange and the peach. Most certainly it is entitled to a place among the ten best fruits of the Tropics.

As with the mangosteen, we can probably blame our delay in bringing the lychee to the American Tropics on the difficulties of transportation in the old days. Today there are fruiting lychee trees in Florida, in Cuba, in Central America, and doubtless in a few other places in tropical America. But there are not nearly enough of them.

There seems no reason why the lychee cannot be widely and successfully grown in the Americas. True enough, it resembles the mango in its failure to fruit abundantly in wet climates; but there are plenty of locations admirably suited to it, and plenty of people who would enjoy eating lychees if they could get them.

The Guanábana

In placing the guanábana among the ten best fruits of the Tropics, I realize that there may be people who will take issue with me, but they will not be Cubans. The people of that Island long ago learned to appreciate the guanábana

and to make the most of its unique flavor.

The guanábana—known in the British colonies under the rather unpleasant name of soursop—is not a fruit to be eaten out of hand. The Creator obviously intended it to be used for ices and cooling drinks, and for this purpose it has few, if any, equals. Those fortunate persons who have sipped a champola de guanábana at one of the delightful cafes for which Habana is famous rarely fail to inquire for this drink—made by mixing the juice of the guanábana with milk and sugar, and chilling it thoroughly—when they return to the Tropics. Many of them ask why it would not be possible to put guanábana syrup on North American soda fountains.

The guanábana belongs to the same family as the cherimoya and the fruit is similar in flavor but with more acidity. It is commonly cultivated as a dooryard tree throughout tropical America.

The Sapodilla

It is difficult to select with confidence the last candidate for the list of the ten best tropical fruits. I have chosen the sapodilla because, although there are a number of others which perhaps have as good a claim, few are sponsored by such estimable authorities.

(Continued on page 15)

HAITI MAKES RUBBER HISTORY

by THOMAS A. FENNELL

IT is early summer of 1903 in Bayeux, Haiti. Chanting to the rhythm of a native drum, a labor gang toils in the broiling sun, planting rubber seedlings for a European who has the fantastic notion that rubber can be grown in Haiti, where none has ever grown before. That pioneer, a wealthy Belgian whose name has vanished with the years, started something, although 38 years passed before . . .

Washington, D. C., Western Hemisphere . . . May 5, 1941 . . . From the Department of State issues this press announcement—a milestone in the world history of rubber production:

"In an endeavor to decrease the present total dependence of the United States upon . . . distant areas . . . for essential rub-

ber supplies, the American Government and the Government of Haiti have reached a new long-term agreement for the development of agriculture and economy. . ."

As Agricultural Adviser to the Haitian Government, Thomas A. Fennell has been one of the prime movers in the agricultural program he discusses in this article. Born in Kentucky, Mr. Fennell joined the staff of the U. S. Department of Agriculture in 1928 and 3 years later became Superintendent of the Department's Plant Introduction

Garden at Coconut Grove, Fla. In 1935 he was named Assistant to the Director of the Beltsville Research Center at Beltsville, Md. He went to his present position in Haiti in November, 1939, under a cooperative project of the United States and Haitian Governments to develop the latter Republic agriculturally.

Between the two dates were years of planning, exploration, and research by courageous, far-sighted men. Ahead lies the prospect of a new source of rubber in the Western Hemisphere, a new industry for Haiti and an expanded market for the products of the United States.

* * *

The necessity for increased production of rubber in the Western Hemisphere has long been recognized. In recent months, the United States Department of Agriculture, through surveys and experimental plantings in Latin America, has

laid the groundwork for actual rubber production in every country in tropical America. A central rubber experiment station in Costa Rica and propagation and breeding stations in Honduras and Haiti have been established.

As a development of the Department's rubber project comes the Haitian agricultural expansion plan, of which rubber is the keystone. Here, in its broad outline, is that plan.

We will plant rubber trees. We will try to eliminate plant diseases and irregularity of yields that make production of such staples as bananas and cacao uncertain. We will develop production of such tropical crops as oils, spices, and fibers, for which the Western Hemisphere now depends on sources thousands of miles away.

For this expansion, we will use technical skill and capital from the United States.

Chronologically, the history of rubber experiment work in Haiti from which the program has emerged goes about like this:

1924-25—U. S. Department of Agriculture establishes plantings at Bayeux and carries on experimental tappings of the trees planted in 1903, which had been abandoned in about 1912 after the death of the Belgian planter. (These 38-year-old trees still exist, disease free and with known production records. They are trump cards in the new program.)

1926—U. S. Department of Commerce reports favorably on possibilities of Para rubber production in Haiti.

1927-38—Rubber production in Haiti—and in the Western Hemisphere—practically stands still. Then suddenly—

1939—A world at war. U. S. rubber industry faces loss of its Far Eastern supply sources. A program to develop Western Hemisphere rubber production is launched.

March, 1940—H. F. Loomis of the Bureau of Plant Industry, U. S. Department of Agriculture, makes rubber survey of Haiti.

March, 1941—Bureau of Plant Industry survey party of four men visits Haiti, is convinced that Hispaniola (Haiti and Dominican Republic) offers opportunity for encouragement of small-grower rubber industry.

March 29, 1941—Work begins on rubber nursery and experiment station at Marfranc in Grand Anse region of southern peninsula.

April 10, 1941—First of 4,300 plants representing 132 of highest-producing clonal varieties of East Indian strains of *Hevea brasiliensis* planted in nursery.

That experiment station has been a special joy to all of us, because it shows the careful planning and the inter-agency cooperation that have marked the whole enterprise. Let me cite a few instances.

Here's one. The Hevea plants were brought to Haiti from the Philippines by Professor H. H. Bartlett, commissioned by the United States Department of Agriculture to secure them from the Goodyear Rubber Company's estates. The shipment left Mindanao on February 12 and arrived in Haiti April 9. So carefully was the shipment prepared that when the cases were opened at Marfranc between April 10 and May 3, only 16 of the 4,300 plants were in bad condition.

Here's another example. For a long time we had been hearing that any organization that set out to obtain a sizeable acreage of land in Haiti was foredoomed to failure. The experiment station consists of 400 acres, all of it State-owned

and almost entirely occupied by renters. The renters cooperated as readily as the government in making the land available.

And a third. Under the supervision of R. J. Seibert of the Bureau of Plant Industry of the United States Department of Agriculture, the clearing and development necessary before the first plantings could be made were completed within 10 days after the United States and Haitian Governments had arranged to establish the nursery.

In mid-March of this year, following several preliminary memoranda, I submitted to Dr. Earl N. Bressman, Assistant Director, Office of Foreign Agricultural Relations, a program for



Pan American Airways photo.

President Elie Lescot of Haiti. (See inside front cover for his statement.)

getting into commercial rubber production in Haiti almost immediately.

Dr. Bressman, for years the guiding hand in all plans for Western Hemisphere agricultural expansion, enlisted the interest of the Department of State and the United States Export-Import Bank. In late April began the final negotiations which led to the agreement announced in May.

We were fortunate in having with us at that time His Excellency Elie Lescot, newly elected President of Haiti, who devoted a great deal of his time to the agricultural negotiations, which

The Republic of Haiti

*Showing areas considered
promising for development
under new agricultural program*



he regards as fundamental to Haitian welfare.

The supervising agency for the new program will be a Corporation formed through cooperation of the Governments of Haiti and the United States. Under its charter, this Corporation will be authorized to carry out in every way a large business whose purpose is to foster agricultural and crafts enterprises in Haiti. It may grow, process, and buy and sell for local and export markets all types of agricultural and manufactured products, except that it will not buy nor export bananas.

The Corporation expects to encourage the planting of improved strains of high-yielding rubber plants by local growers and to furnish yearly, within 3 years, a sufficient number of budded rubber plants to plant at least 2,500 acres annually for 10 years. In return for this service, the Haitian Government agrees to give to the Corporation the exclusive right to purchase, for domestic and export markets, all rubber produced in the Republic.

This is merely the broadest possible statement of the Corporation's functions. One of its most important units will be a Research Division, which will make numerous trial plantings of Hevea trees and other promising crops in potential producing areas of the Republic. By careful measurement and observation of the growth and behavior of plants under these conditions, we should know at the end of 2 or 3 years the type of growth we can expect in the different areas.

Meanwhile, the work at the Marfranc experiment station will continue. The combination of fundamental and practical research carried on by these two agencies in cooperation should result in one of the most efficient rubber plantings in the world.

There are four principal areas in Haiti which are well adapted to the plantation growing of rubber. These are the Grand Anse Valley, which contains some of the country's most fertile soil and has a well distributed annual rainfall of approximately 85 inches; the Bayeux

Valley on the northern coast; the lower Cayes Plain on the southern coast; and the North Plain, parts of which will require irrigation but which, fortunately, has a bountiful supply of irrigation water. In these areas the work of the new Corporation will be concentrated.

The immediate objective is the establishment of plantations totaling approximately 6,500 acres of bananas and 7,500 acres of rubber. Rubber seeds and seedlings for this purpose are already available. From the nucleus of the Corporation plantations, we have every reason to believe that peasant plantings of tropical crops will spread. Today, Haitian farmers concentrate their production on a few staple crops—coffee, cotton, cacao, sugar, and bananas, to mention the leaders. Too often, these commodities are subject to depressed prices on world markets. When that happens, Haitians have little cash income and are dependent almost entirely on the things they grow for their own subsistence, which are far from sufficient to maintain a desirable standard of living.

It is hoped that under the new plan they will direct their efforts toward new tropical crops, which now are scarcely known in Haiti. Valuable products used in the spice, drug, oil, and fiber fields seem to hold real possibilities.

It should be made clear that the new program will not in any way alter the present pattern of land ownership in Haiti, which is essentially a country of small peasant-owned farms. This has been true since Haiti became independent, when slavery was terminated and the lands of the French "great planters" were confiscated by the State, then redistributed in small lots to the officers and soldiers of the Army of Independence.

Women work on the farms just as men do. Whole families clear and till the land, harvest the crops, and transport them to market. That system is the foundation of the whole Haitian way of living, and any program that would tend to alter it would be doing Haiti a disservice.

For a long time all of us were victims of the generally accepted fallacy that rubber production is necessarily the province of the large corporation, not suited to the practices of the small land-holder. That notion has done much to limit the cultivation of rubber in the American tropics.

I was shown the light by a visitor who stayed overnight with me in Haiti early last fall. He is Loren G. Polhamus of the Bureau of Plant Industry, who supervised the 1924-25 Haitian experiments and who has long regarded Haiti as a potentially important source of rubber. In that one evening, Mr. Polhamus converted me to his belief that small holders not only can cultivate rubber but can produce it in competition with large holders to greater advantage than perhaps any other tropical crop.

That thesis is fundamental to the whole program for the agricultural expansion of Haiti. Under the Corporation's plan of operation, contracts will be entered into with the peasants for

the production of rubber, cacao, and other products which it is desired to encourage. The Corporation will furnish seed, provide technical supervision and assistance and agree to purchase the crops after they are harvested. Its land holdings will be limited to its central plantations, which will be used largely for demonstration and experimental purposes. All agricultural labor to be used on the plantations will be recruited in Haiti.

Having considered what the Haitian agricultural plan is, how it developed, and how it will be put into effect, let us see what effect it may be expected to have on Haiti, the United States, and the Western Hemisphere in general.

From the Haitian viewpoint, money spent for the development of this project will help to ease the country's present financial crisis just as much as it if were spent on a public works project. But, since the expenditure will be for

(Continued on page 15)



Buying rubber seed from Bayeux natives for planting at Marfranc nursery.



Rubber stumps from Philippines being unloaded in Haiti.

Bureau of Plant Industry Photos.

COLORFUL GUATEMALA

by PHILIP LEONARD GREEN

ON First Avenue in Guatemala's picturesque former capital, Antigua, stands the restored Spanish-colonial residence which Louis Adamie has praised in his fascinating book, "The House in Antigua."

Little did its original occupant, the doughty Don Luis de Infantas Mendoza y Venegas, dream that it would one day be the home of a kindred spirit—a new kind of *conquistador*.

Yet Dr. Wilson Popenoe, who owns the house today, is precisely that. He has won Guatemala, identified himself completely with it, through deep understanding and genuine friendship. And what he knows about Guatemala, he has learned at the grass roots, by long patient study of *the people*. There lies the secret of his understanding, and for others who take the trouble to explore Guatemala in this way, rich rewards lie in store.

Unlike many other Latin American countries, Guatemala was visited by relatively few Spanish *conquistadores*. Furthermore, later immigrations from Europe have not been heavy. In fact, it has been estimated that there is only one person of pure European stock to about 4,500 others. Nineteen Maya dialects and one Aztec or Nahuatl dialect are still spoken in Guatemala.

Racial blends make up a considerable part of the population, but it is the Indian who gives to the country the colorful quality for which it is still famous, despite changing customs.

Divisions among the people do not follow so much along racial lines, however. They are determined more by economic status, intellectual



"Banana Tree, Guatemala"

(A Painting by Marjorie S. Garfield.)

Washington Star Photo.

achievement, or locality. Age-old tribal divisions can still be detected by noticing the garb worn by the Indians on any market day. Anyone familiar with the various regions of Guatemala can tell in an instant what village the wearer of a certain dress or cloak hails from.

The Indians of Guatemala who form such a considerable part of the population are an agricultural race—thrifty and reliable. They do not constitute an aggravation of the land problem there, as has often been the case elsewhere. In fact, the demand for land by a submerged class, which is so important a part of the agricultural picture in some countries, scarcely exists at all in Guatemala. Because of the mountains there are few large cultivable areas, but there are plenty of small ones. Thus, those who wanted land have always been able to obtain it.

Since the proportion of land owned by for-

eigners has never been large and now averages less than one-third of the total cultivated land of the Republic, such land distribution as did take place has not damaged vested interests, as has happened so often in other parts of Latin America. In fact, an early law provided that foreigners who married Indians and *mestizos* were to be given a land grant of double size.

Of recent years, there has been a considerable effort to get more of the country into cultivation. Grants of land up to 10 *caballerías* (335 acres) were authorized by law in 1934. Those who received these grants were also given seeds, tools, and transportation to their lands. Four years later a national land colonization office was set up to create small holdings of publicly owned lands and thus encourage the local raising of products for daily consumption that might otherwise have to be imported. An agricultural mortgage bank has been created to grant credit to farmers.

A large part of Guatemala's agriculture is carried on in small fields or patches; and while this does not present a rosy picture for the manufacturer of agricultural machinery, it does make for a great deal of self-sufficiency and independence on the part of the populace.

One of the greatest drawbacks to farming in Guatemala has been the lack of communication among the various parts of the country; but the Government has consistently tried to remedy this situation by fostering a road-building program.

When the *conquistadores* arrived in Guatemala they found few of the products to which they had been accustomed. Oats, barley, and rye had to be brought over from Spain. The same was true of apples, bananas, grapes, peaches, pears, and plums. Sugar was introduced from the Spanish island colony of Santo Domingo.

What the *conquistadores* did find were such native vegetable food products as corn, beans, chiles, squashes, potatoes, and tropical fruits.

The chief among these, then as now, was corn. To this day, the crops named form the basis of Guatemalan cuisine.

These products are all raised on the numerous small vegetable patches of the country, so that Guatemala, from a food standpoint, is highly self-sufficient as a national unit. That is to say, some regions may be lacking in certain products, as is natural in a country having so many different altitudes; but as a country, it depends very little on foreign trade to supply the foods it needs to carry on life.

They Go to Market

Once a week and in some regions twice. Indians from far and wide will gather at trading centers to exchange their market products for the things they need. Market days are usually occasions for the exchange of gossip as well as goods. They are held in the open in public squares of towns and villages.

Among the articles one may see on a trip through such a market are corn, eggs, fruits, lard, pigs, pork, and poultry. At special times, one may also buy cattle, goats, and sheep. Some of the trading centers are so strategically situated that they offer an opportunity to exchange products from the mountainous districts (such as apples, potatoes, wheat, and wool) for those of the hot lowlands (bananas, cacao, cotton, mangos, oranges, and sugar).

Guatemala, then, requires few things from abroad in the way of basic necessities. Neither is she as dependent on export trade as are many other countries. While such manufactures as flour, sugar, beverages, leather-goods, soap, and candles are important locally, they do not enter into foreign trade. The only large export crops are bananas and coffee. The banana lands are largely foreign-owned. More than half the coffee *fincas*, on the other hand, are of Guatemalan ownership.

One of the latest developments in the direc-

tion of supplying Guatemala with additional income from exports, which will at the same time assure the United States of a nearby source for essential imports, is the cooperative effort of Guatemala and the United States in encouraging the growth of quinine and rubber.

The United States Department of Agriculture has sent to Guatemala a number of species of quinine plants, obtained from the Philippines and other regions. Several local nurseries have been set up. It is too early, however, to judge the real value of these plants. The Guatemalan Ministry of Agriculture realizes the need for expert technical knowledge but believes that if certain problems are overcome, Guatemala will be able to count on an important source of additional income.

Last fall a party of four experts from the Bureau of Plant Industry of the United States Department of Agriculture visited Guatemala to examine, in cooperation with local officials, areas of potential importance for the growing of rubber. The party was impressed with the possi-

bilities of several areas, particularly some districts of the West Coast.

At present, coffee is an important crop in this region, the best quality being produced at the higher elevations. Rubber has its greatest possibilities at elevations under 2,000 feet. Both of these important tropical products might be grown in the same general area but at different elevations.

Aside from opportunities for agricultural initiative, Guatemala has much to offer. For the naturalist, for the student of ancient American races, or for people who seek only the rest and inspiration of a country still free from heavy tourist visitations, Guatemala truly is a glorious land.

The Republic of Colombia has created a Technical Advisory Council as a unit of the Ministry of National Economy to orientate all the agricultural experiments and investigations of the Government.



Photo by Guatemalan National Tourist Committee.

Church and plaza—community gathering place at Nahuala, Guatemala.

American Ambrosia

(Continued from page 6)

Gonzalo Fernandez de Oviedo, who was one of the first Europeans to make a study of the plants of the New World and who wrote a report to the King of Spain which is respected even today, called the sapodilla the best of all fruits. Thomas Firminger, who lived for many years in India and wrote the classic work on horticulture in that country, said: "A more luscious, cool, and agreeable fruit is not to be met with in this, or perhaps, any country in the world."

To us, the sapodilla has more than the virtue of being a good fruit. It is definitely our own, for it grows wild in southern Mexico and Central America, where it is valued also for the *chicle*—source of chewing gum—which is obtained from the trunk of the tree.

Perhaps one reason for giving it preferred consideration is that it lends itself so admirably to improvement at the hands of modern horticulture. The sapodillas (or *nísperos*, or *chicozapotes*, as they are sometimes called) which are commonly seen in the markets of Central America and the West Indies are 2 inches in diameter. Occasional trees bear fruits 4 inches in diameter, with very few seeds. These trees can be easily propagated by grafting, just as with mangos, avocados, and other tropical fruits.

* * *

One final word. It is unfortunately true that tropical fruits, particularly those of the Western Hemisphere, have been slow to receive attention from both consumers and plant breeders. Yet, when we consider that it is scarcely more than a century since many of the choice fruits of the temperate zone were taken out of the wild and brought under the influence of horticultural science, we have no reason to feel discouraged about the possible development of the tropical fruit industry.

Haiti Makes Rubber History

(Continued from page 11)

large producing plantations, the investment will soon begin to pay dividends and the jobs created will be permanent and should grow in number and value. If this one project alone can be carried out, the national income of Haiti can be more than doubled. All the figures I have been able to assemble indicate that the investment in the central plantation can be liquidated within 20 years.

So far as the United States is concerned, it also stands to gain from this cooperative endeavor. Only crops that are noncompetitive with United States agriculture will be grown. All of them are imported in large quantities into the United States, most of them from the Far East. If the plan is realized in full, a final planting of nearly 70,000 acres of high-producing strains of Hevea trees will result. This amount of rubber—nearly 35,000 tons per year after the plantings reach full production—represents more than 5 percent of total United States rubber consumption in a normal year. It is not a quantity to be regarded lightly!

Furthermore, a prosperous Haiti, with a standard of living that rises as its income grows, will be a steadily improving market for United States products—not only for tractors and automobiles and drugs and clothing, but for countless processed foods which it cannot produce efficiently, flour and canned goods, for instance.

The entire Western Hemisphere will benefit greatly, I believe, from this experiment in agricultural cooperation between the two sister American Republics. What can be done quickly in Haiti, because of the country's small size, can in the long run be done in many another Latin American country, where potentialities for production of new crops are just as great and just as little developed.

In Haiti, we feel that this new program has brought all the Americas to the threshold of better living on their land.

ALONG THE AGRICULTURAL FRONT

EXPERIMENT STATION FOR ECUADOR

In order to spur the production in Ecuador of noncompetitive crops for export to the United States, Dr. Arthur G. Kevorkian has been employed, upon recommendation of the U. S. State Department, to assist the Ecuadorian Ministry of Agriculture in establishing an agricultural experiment station.

Dr. Kevorkian, a graduate of Rhode Island State College and Harvard University, has been attached to the Agricultural Experiment Station in Puerto Rico the last 4 years. He is a specialist in crops which it is hoped to establish in Ecuador.

SOCIETY OF AGRICULTURAL SCIENCES

The American Society of Agricultural Sciences is a nonofficial organization of and for agricultural workers in the Americas. The Society was suggested by several young Latin American agriculturists and there are now chapters in Argentina, Colombia, Cuba, Dominican Republic, Guatemala, Panama, Puerto Rico, United States, and Venezuela. The president of the organization is E. G. Holt of the U. S. Department of Agriculture and the secretary is J. L. Colom of the Pan American Union.

At its most recent meeting in Washington, the Society elected Dr. Earl N. Bressman and Edwin R. Kinnear of the Department of Agriculture as president and secretary of the United States

Section. The Society also arranged to publish a quarterly publication in Spanish, with Philip Leonard Green of the U. S. Department of Agriculture as editor.

Although at the present time, the majority of the membership of the United States Section is comprised of workers in the U. S. Department of Agriculture, it is the hope of the Society that more nongovernmental people will be interested in securing membership.

FOURTH LAGUNA CONFERENCE

Social changes that have occurred in the Laguna region of Mexico since 1936, when land was given to almost 32,000 peasant families, will be discussed at the Fourth Laguna Conference on Cooperative-Collective Farming, to be held August 4, 5 and 6, in the Hotel Galicia, Torreon, Coahuila, Mexico.

General theme of the conference will be "The Crisis in La Laguna and How It Is Being Met." In addition to talks by peasants, doctors, teachers, cooperative leaders, and agricultural engineers, there will be field trips to collective farms, clinics, new housing, women's league headquarters, schools, and peasant meetings. Speeches will be delivered in English.

A complete program for the conference may be obtained from Clarence Senior, Director, Laguna Conference, Avenida Chapultepec 512, Mexico, D. F.

Vol. I

Robert H. Ingram, Editor

No. 6

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Contributing authors are staff members of the Office of Foreign Agricultural Relations unless otherwise designated.

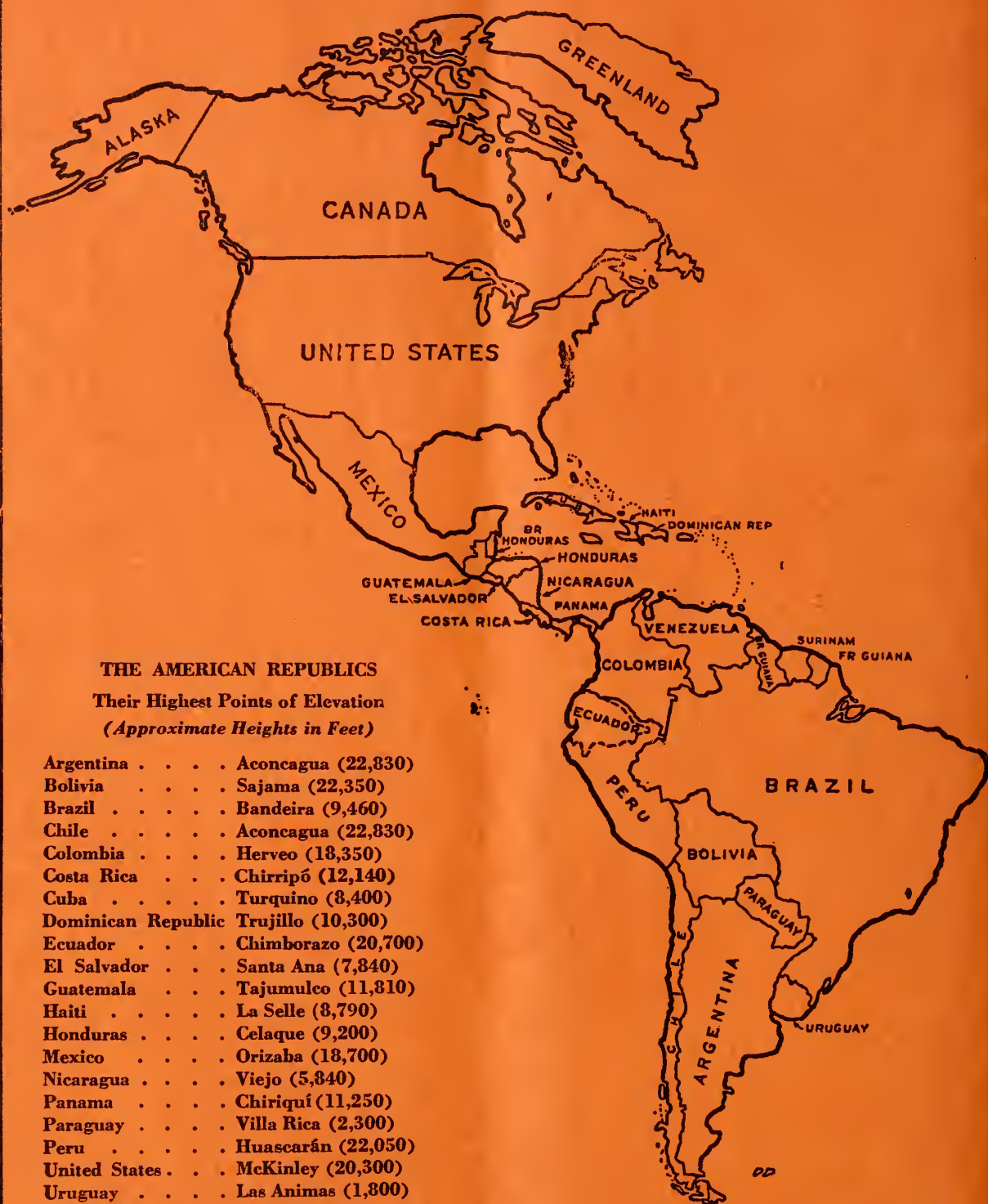
Dr. Wilson Popenoe—*Our Mutual Friend*

Dr. Wilson Popenoe speaks with authority about Latin American horticulture. He also writes about it with charm and humor, as his article, "American Ambrosia," in this issue, indicates.

Sound as his scientific knowledge is, he is no mere peerer through microscopes. Genial in personality, broad in his interests, and somewhat of a Western Hemisphere traveler, he is in his quiet way one of the most effective ambassadors of Pan American goodwill wherever he travels in the United States and the Caribbean area.

A native of California, Dr. Popenoe has lived in tropical America more than a quarter of a century. His permanent home is in Antigua, Guatemala. For 10 years he was a plant explorer for the United States Department of Agriculture; for the last 16, he has been in charge of research for the United Fruit Company. Since 1939 he has been lent to nine different governments in the Western Hemisphere, including the United States, as an adviser on tropical horticulture. His textbook on tropical and subtropical fruits is the standard work on the subject.

When Dr. Popenoe was in the United States recently, we asked him to write about tropical fruits for *Agriculture in the Americas*, because we believe the industry is one of many that can be expanded in the Western Hemisphere with benefits to both Latin American producers and North American consumers.



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Agriculture IN THE *Americas*



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August 1941

OFFICE OF FOREIGN AGRICULTURAL RELATIONS
UNITED STATES DEPARTMENT OF AGRICULTURE

Two Kinds Of Imports . . .

THE desirability of increasing our trade with Latin America in bolstering the Good-Neighbor Policy is universally recognized. One means of doing this is to purchase from our neighbors the tropical products which we ourselves do not produce and which we have formerly bought from more distant quarters of the globe. They *complement* our own agricultural output and are known as complementary products.

But the Western Hemisphere produces many products far in excess of its capacity to consume them. Chief among these are corn, wheat, cotton, and meat products, all of them produced abundantly in the United States as well as in the countries of Latin America that lie within the temperate zone. The United States naturally provides only a restricted market for products like these. At most, they *supplement* to a limited extent our own agricultural production.

Thus these products constitute Western Hemisphere surpluses, and finding markets for them has always been an agricultural problem of the Americas. The difficulty has been accentuated by the war, since Europe, once the chief market for the export food products of the Western Hemisphere, has been virtually closed by the British blockade and by the requisitioning of much commercial shipping for military use.

Some of the problems this situation brings up are touched on in two articles in this issue of *Agriculture in the Americas*.

"Argentine Corn—A Story About a Surplus," on page 1, is by Guy L. Bush, who is Regional Representative at Denver, Colo., of the Agricultural Adjustment Administration. Mr. Bush recently returned from an extensive trip through Brazil and Argentina, where he was sent by the U. S. Department of Agriculture to study agricultural conditions. In this article he describes his impressions of rural Argentina, with emphasis on that country's big supply of exportable corn—a typical Western Hemisphere surplus.

F. H. Rawls, author of "Foods the Americas Buy and Sell," on page 4, is Director of the Merchandise Unit, Bureau of Foreign and Domestic Commerce, U. S. Department of Commerce, and a member of the Inter-American Committee for the Dairy Industries. His article deals with both supplementary and complementary food products of Latin America. More detailed information appears in a Department of Commerce publication, "Foodstuffs Trade with Latin America," which was prepared under Mr. Rawls's supervision and may be obtained from the Superintendent of Documents, U. S. Government Printing Office, Washington, D. C., at 10 cents a copy.

Argentine Corn

A Story About a Surplus

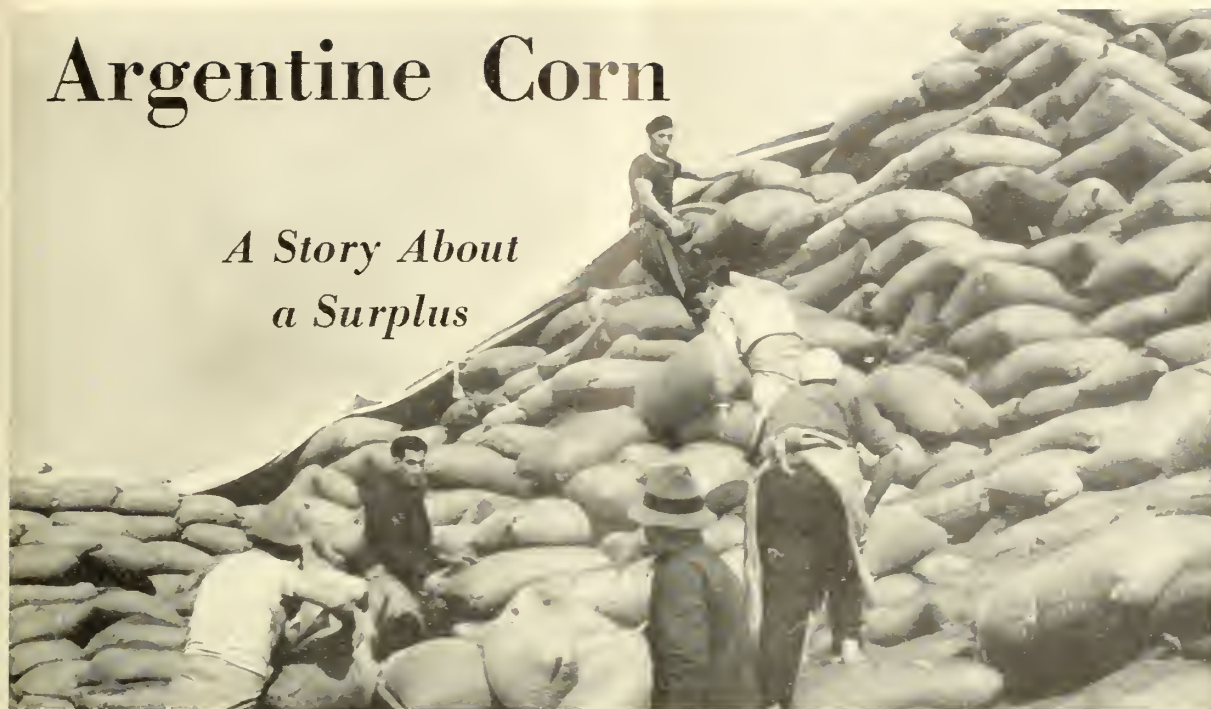


Photo by Life Magazine.

by GUY L. BUSH

DOWN in the Argentine ranchers raise and fatten their cattle for market on grass.

Grass is the cheapest and most efficient feed they have. There's plenty of it. Even with corn overflowing their cribs, cattle feeders still don't go to the bother of feeding corn because they don't need to. From 75 to 80 percent of the country's corn is grown for export.

Argentina is the second largest nation in Latin America, about a third the size of the United States, and strictly a farming country. The most

For more information about the author, see inside front cover.

productive area is about the size of the State of Iowa—just as fertile and just as level as any of the best land to be found in the Corn Belt.

I spent 2 weeks driving through this area in February of this year with Paul O. Nyhus, agricultural attaché of the United States Embassy in Buenos Aires. We visited many of the great *estancias*, as the large ranches are called, talked with landowners, tenants, farmers, farm laborers, and many of the businessmen engaged in the agricultural trades.

Practically all of last year's corn crop is

backed up on the farms and ranches. Most of this corn is stored in open cribs—cribs made of No. 9 wire and lined with corn or sunflower stalks. Naturally, there has been considerable damage from grain weevil and from exposure to the weather.

"With corn so plentiful," I asked the ranchers and farmers with whom we visited, "why don't you feed it?"

Their reply was always the same, "No matter how cheap corn is, grass is cheaper."

The livestock industry of Argentina was founded on grass. Fifty percent of the producing area of the country is still covered with rich native grass, and much of this yet unbroken prairie land is available for cultivation if and when needed.

Argentine cattle are fed out on grass because the soil of Argentina gives to grass "that something" which makes it suitable for fattening cattle, and because grass-fed cattle are acceptable to the export trade. The attitude of every rancher and farmer we visited appeared to be, "Why should I bother feeding corn, no matter how cheap it is, when the grass is already there?"

On the first day out from Buenos Aires, Mr. Nyhus asked our driver to stop at a place where he saw men about the buildings. Shortly we

turned off the paved highway down a dusty lane and came to a stop before a set of farm buildings. A gray-haired man, who I learned later had been a tenant on this farm for 30 years, came out to meet us.

This tenant and his son operated 300 acres of a 40,000-acre *estancia*. There were 161 other tenants in addition to 52 field workers, farm managers, bookkeepers, and others who make up the staff for an operation of that size, which is fairly representative of the region. The tenants turned 30 percent of their crops over to the owner and furnished their own equipment. The workers were paid a daily wage.

Argentina's seasons are just reversed from ours, and the time for the 1941 corn harvest was approaching. Still, 7,000 bushels of 1940 corn, harvested almost a year before, were stored on this farm in three open, corn-stalk cribs. I asked the tenant if it was the custom in his country to store corn in that manner, exposed to the weather.

"Yes," he said, "but this is the first time since I've been farming that we've kept it so long." Normally, he explained, corn is cribbed on the farm for only a few months before it is shelled, bagged, and sent to seaport warehouses for shipment overseas. Practically all the corn in the Argentine is of the flint type, more suitable for long water hauls and more in demand by the European market than the dent corn of the United States Corn Belt.

"What are you going to do with all of this corn?" I asked.

"It's no longer mine," he said, "it belongs to the Government."

In fact, practically all of the corn in the whole country belongs to the Government. Shortly after the harvest in May and June of 1940, the Argentine Grain Board inaugurated a corn-purchase program when it became apparent it was impossible to sell any major portion of the crop.

The Government offered farmers the equivalent of about 20 cents a bushel at the farm. Eighty percent of this was paid at the beginning of the purchase program. The balance was to be paid when the corn finally was moved into export.

With the export market cut off due to the war, the Government has not been able to export the grain and has not paid the balance. Since I was

there, corn has been offered for resale at the equivalent of about 5 cents a bushel.

While visiting with this tenant, we walked into a field of new corn. The ears were filled and drying in mid-February, and in 60 days the corn would be ready for husking. We estimated the field would yield 60 bushels an acre. It was typical of many fields we saw on a 1,500-mile automobile trip through the heavy producing sections of the country.

Farmers were saying then that the 1941 corn harvest would break all previous production records. At actual harvest time in May, I understand, the estimate was revised downward somewhat, but even so the crop was larger than in 1940 and among the biggest in Argentina's history.

Near the cities in rural Argentina we saw corn that had been placed in warehouses before the Government started its purchase program being

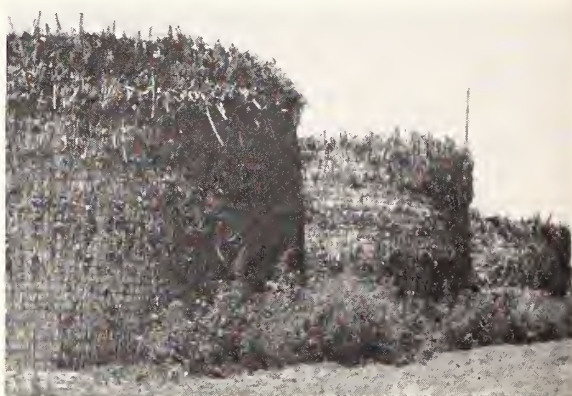


Photo by Guy L. Bush.

Farm storage of Argentine corn.

moved out to make room for the current crop of wheat and flax. Several million bushels of this corn, all of it sacked, were being racked in piles on large wooden platforms along railroad rights-of-way and covered with canvas. Many of these piles contained 10,000 bushels.

We stopped to talk with a warehouseman, whose employees were busy carrying 125-pound sacks of corn on their shoulders up a movable stair to the top of a huge pile, and asked his opinion about the use to which this backlog of corn might be put.

"We shipped our 1938-39 crop out at a sacrifice," he said. "Now it looks as though the only way we can use this crop is for fuel, unless the war ends pretty quick."

Later Mr. Nyhus and I visited the sub-basement of a huge power plant in Buenos Aires. Here engineers were experimenting with the use of corn for fuel on a large scale. They were burning a mixture of 40 percent corn and 60 percent coal, since they had found that the hard flint corn alone burned out the grates of their furnaces. Two boilers in the plant were being refitted to burn unmixed corn.

The Argentine Government has encouraged the industrial use of corn for fuel, but at the time I left the country it was not being used extensively.

The Government is also giving serious consideration to the use of corn in producing fuel alcohol, although at best that probably represents no more than a partial solution. In the United States, production of fuel from corn has not advanced far for a variety of reasons—chiefly the high cost of the raw material and the abundant supply of more efficient fuels in this country. In Argentina, where corn can be purchased much more cheaply, and a high percentage of oil and gas must be imported, the use for fuel of alcohol produced from corn seems to be worth all the scientific study that is being devoted to it. Certainly the Argentine scientists should have every opportunity to study any findings made in the new regional laboratories recently established in the United States.

Argentina's corn problem is typical of the situation that confronts many of our neighboring Latin American nations today. Something has happened that is totally outside their previous experience, and they are hard pressed to find the solution.

Along the waterfronts of large port cities, boats are not calling for the grain that lies in storage. Unused foreign shipping is tied up in the harbors. Exporters are clamoring for shipping space, but few are getting it. The Argentines' former European customers are getting supplies over the shortest possible ocean haul, just as they did in the first World War. They aren't venturing over the long hazardous route to the South Atlantic and the South Pacific if they can avoid it.

Both rural and city people are feeling the pinch of lost export markets and piled-up surpluses. I got the impression that the city people were groping for a solution to a problem they didn't fully understand.

The "man in the street" in the cities knew something had hit him, but he didn't know for certain what it was. The farmer knew what had hit him, but he didn't know for certain what to do about it.

It reminded me of the Middle West in 1930 and 1931, when we were going through the first severe effects of the depression and hadn't got even close to a way out.

Argentina has extensive unused land reserves and is not approaching the production of corn and other export agricultural crops that it could achieve if world prices justified placing new land in cultivation. Curtailment of grain acreage is not indicated as a soil-conservation measure there, as it is in the United States. The Argentine corn farmer, therefore, goes on planting normal acreages of corn, the crop for which he is equipped and on which he has depended for years. He has little alternative.

The Argentine Government is helping all that it can, through its grain-purchase programs and the construction of warehouses for the long-time storage of small grains.

I talked to a good many people high in Government circles about the problem. I asked them what solution they saw. No one, no matter how well informed he was, could give me a clear-cut answer, but there seemed to be general agreement on these points:

(1) Argentina's troubles are not entirely war-born, nor will they automatically end when the war is over.

(2) Lacking a better market for the staple cereal crops, Argentina needs and is already turning toward agricultural diversification, development of small home industries, and expanded trade with the other Americas.

(3) The United States and the Argentine, by developing greater mutual understanding of each other and by presenting their resources and their bargaining power unitedly to the world, can co-operate without endangering the economic welfare of any particular group or the independence of either country.

My trip convinced me that somewhere within that framework lies the solution of the agricultural trade problems, not only of the Argentine but also of the other non-tropical Latin American countries whose major farm products are similar to those of the United States.

FOODS THE AMERICAS BUY AND SELL

by F. H. RAWLS

LATIN AMERICA is both an important market for the food products of the United States and one of this country's chief suppliers of foodstuffs. The Latin American Republics sell one kind of food products to the United States, buy another.

In the past 15 years from 20 to 25 percent of all the foods the United States has sold for export have gone to Latin America. During the war period it has become even more important as a market for us. There is every prospect—if both North and South Americans approach the problem with understanding—that its value to United States producers will continue to increase.

In 1940 our total exports to Latin America amounted to about 719 million dollars, with iron- and steel-mill manufactures as the largest

For more information about the author, see inside front cover.

single item. In the same year our food exports to Latin America were valued at 64 million dollars, or well over one-fourth of our total shipments of food to all countries of the world. We did business in food with every one of the other 20 American Republics, selling them some 75 separate products.

Of course, it should be recognized that Latin America is not a major market for the chief export crops of the United States, since, in general, production of wheat, meat products, corn, cotton, and tobacco in Latin America fills local requirements. Greatest returns to United States farmers will come indirectly through the stimulation of United States industry that will result from increased trade with Latin America. The American worker, steadily employed, has always been the American farmer's best customer.

At the same time, our foodstuffs trade with Latin America is not to be regarded lightly. While in large part it consists of specialty products that range from cornstarch and rolled oats to chewing gum and walnuts, such staple products as wheat and wheat flour, lard, and rice accounted for two-fifths of our Latin American food trade in 1940. Some of the most notable

increases in exports to Latin America in recent years have been in soybean oil, malt liquors, milled rice, malted milk and infants' food, dried whole milk, yeast, and hops.

In foodstuffs trade, Latin America is even more important as a source than as a market for the United States. It furnishes roughly 50 percent of all the foods we use that we do not produce on our own farms, and foodstuffs account for nearly half of all the products we import from Latin America.

But when you come to analyzing this flow of foodstuffs into the United States from the forests and fields of its southern neighbors, you quickly discover two major faults: First, we buy from too few countries; and, second, we purchase too few commodities. In 1939, the last pre-war year, 5 of the 20 Republics and 5 products represented five-sixths of our food imports from Latin America.

This lack of diversity is no one's fault especially. Other products simply haven't been available, nor have other Latin American countries been in the market for our trade. The war and the great concern of all of us for more Western Hemisphere solidarity have changed all that. Products that once went to the European market are accumulating in Latin America. Former sources of United States supply in the Far East have been cut off by the shipping shortage caused by the war. Diversification of our trade with Latin America may in a sense have been forced upon us, but, now that it is here, we are finding that it is to the mutual advantage of all countries concerned.

Look at it like this. We buy five-sixths of our Latin American food products from Cuba, Brazil, Colombia, Mexico, and Guatemala, in that order. Yet among the countries that are our best foodstuffs customers are several which enjoy relatively little of our business and are accordingly hard pressed to find the foreign exchange they need to continue trading with us.

Five-sixths of our food budget in Latin America is being spent for coffee, sugar, bananas, cocoa beans, and canned beef. All of them are products of which we produce either none or less than enough for our own needs, but they



Photo by Foto-Almscen Lindner, Bogotá.

River shipment of bananas, a major U. S. import from Latin America.

compose by no means a complete list of the products we need to complement our own agricultural production.

It is obvious that if our Latin American foodstuffs trade can be spread over more countries and more commodities, we will be greatly increasing the market for both the manufactured goods and the farm products that we sell elsewhere in the Americas.

This diversification can be done without reducing in the least the business we are now doing with the countries that supply most of our trade. The things we will be buying from the other Americas will be those which once came from the Far Eastern tropics. Quite a good deal, undoubtedly, can be accomplished along this line by giving more attention in the future to products which are relatively undeveloped, either with respect to production in Latin America or to market possibilities in the United States. Outstanding among these might be the babassu palm nut, mandioca, cashew nuts, lentils, and a variety of tropical fruits and spices.

Of course, there is a limit to the diversification that is possible if we confine ourselves to foodstuffs, so I'd like to venture outside my field just far enough to say that the inter-American program for development of Western Hemisphere sources of such products of the soil as rubber, quinine, tanning materials, insecticides, fibers, hardwoods, essential oils, and a variety of others is fully in line with any program for diversification of foodstuffs purchases.

Another method of dealing with the problem, apart from greater diversification of purchases, is through more equitable distribution of the market. This has already been done with outstanding success in the case of coffee through an inter-American agreement, and might some day be advisable with cacao in view of expanding United States purchases from Latin America. Some type of agreement may also be devised to adjust and dispose of surpluses of such Western Hemisphere export products as cotton, corn, and wheat.

Nor should we overlook the possibilities for

increased trade in foodstuffs among the Latin American Republics themselves. Not more than about 20 percent of all the food products exported from the Latin American nations are sold to other Latin American countries. Recent reports tell of good progress in breaking down trade barriers between these neighboring nations, and every indication is for further encouraging developments in this field.

Latin America's foodstuffs exports represent so large a part of its total foreign trade that it is a critical matter when they are seriously curtailed. During 1939 the 20 Republics exported food products valued in the neighborhood of 750 million dollars, or about 40 percent of their total export trade. Of this amount, the United States took 40 percent of the total, the United Kingdom 20 percent, Germany 10 percent, and France, Belgium, and the Netherlands 3 percent each. The latter four, buyers of a fifth of Latin America's food exports, are now practically out of foreign markets, and Great Britain's purchases have been greatly curtailed. How much of that missing market the United States can replace is one of the problems that besets the Americas.

Leading Complementary Products

A product-by-product summary of Latin American foodstuffs for which the United States depends entirely or chiefly on imports indicates how dependent we are on Latin America for many of our essentials and what the possibilities are for increased trade with our southern neighbors.

Coffee.—Since earliest official records, the United States has drawn the major portion of its coffee supplies from Latin America. With coffee the principal export of no less than seven of the American Republics, damaging competition for the United States market is prevented by the inter-American coffee agreement, signed in 1940, to assure each American nation of its fair share of the coffee trade of the United States.

Today, of course, Latin America has lost most of its European markets for coffee, decreasing the volume of its exports. Attempts are being made, through a promotional campaign of the Pan American Coffee Bureau with the United States coffee industry cooperating, to increase United States coffee consumption, but Latin America's producing capacity and present stocks

indicate that large surpluses of coffee are likely to continue for some time.

Cocoa Beans.—Before the first World War 70 percent of the total United States imports of cocoa beans came from Latin America, but in 1939 the percentage had declined to 47 percent. This is true because our chocolate industry has been built up largely on the so-called common or basic cocoa beans, such as those supplied by the Gold Coast of West Africa. Most of the Latin American countries, on the other hand, have in the past specialized in the so-called "fancy" beans, which normally command higher prices. The cutting off of African sources as a result of the present war has meant a very productive cacao market in the United States for the Latin American countries, particularly for Brazil and Ecuador, which supply chiefly the common bean.

The United States buys 60 percent of Brazil's cocoa output and 90 percent of the Dominican Republic's, and also buys considerable quantities from Ecuador and Venezuela. There is still land available in most of the tropical American countries in which cacao could be produced. There is also a considerable opportunity for research into the cause of plant diseases, which annually take a heavy toll of cacao in many of the Latin countries.

Blackstrap Molasses.—Large quantities of inedible molasses, commonly known as "blackstrap," are imported into the United States annually. The principal use is in the manufacture of industrial alcohol. The product is an important source of income in Cuba and some other Latin American countries. Cuba supplies about 90 percent of United States imports of all types of industrial molasses, including blackstrap.

Chicle.—The basic gum used in the manufacture of chewing gum is chicle, the coagulated milk of a native Central American tree. The bulk of United States supplies come from Mexico, but in recent years Guatemala, thanks to improved transportation and government assistance to growers, has become an important supplier.

Brazil Nuts.—Brazil nuts account for about 3 percent by value of total United States consumption of edible nuts, including peanuts. In the last 20 years domestic production of tree nuts has almost doubled. Since United States consumption has not changed greatly, it is apparent

that our higher production of domestic nuts has largely displaced imports.

Bananas.—Bananas constitute both an important source of the food supply in the tropical American countries and a major export commodity. Latin America supplies roughly 80 percent of the world total and all of the United States supply. Fifteen years ago Jamaica was our leading source of supply. Now its entire output goes to British and Canadian markets, and Honduras, Guatemala and Mexico are the principal suppliers of bananas to the United States. From 30 to 35 percent of the bananas exported from Latin America normally go to Europe. Here, again, the war has meant a surplus.

Vanilla Beans.—In recent years the United States has been importing only about 30 percent of its vanilla beans from Latin America, the rest from Madagascar, other parts of French Africa, and Oceania, either directly or by way of Marseille, France, which is normally an important trans-shipment port for tropical produce. Vanillas of each producing area possess distinct characteristics and therefore fall into different price ranges, but there appears to be no reason why United States imports from Latin America cannot be substantially increased. A good deal of the vanilla extract used in the United States is now produced synthetically.

Babassu Nuts.—The kernel of the nut of the babassu palm yields an oil which is used in the manufacture of freely lathering soaps and in margarine. Practically all of our imports come from Brazil, and practically all of Brazil's exports go to the United States. However, that country is estimated to be turning out only a small fraction of its potential production. The lack of an efficient, easily transportable machine to crack the main shell of the nut and the difficulty of bringing the product from the jungles of the interior to the seacoast have limited production and exports.

Tapioca Flour.—Tapioca is the commercial name in the United States for the starch produced from the roots of the cassava plant, also known as yuca and mandioca. The United States is the world's largest consumer, but in the past has obtained most of its supply from the Netherlands Indies, less than 10 percent from three Latin American countries—Cuba, the Dominican Republic, and Brazil. A factory for

producing this starch was established some years ago in the Dominican Republic, and yuca flour is now the fourth largest item in the country's export trade.

Leading Supplementary Products

In addition to the products mentioned above, there are several food products of Latin America which the United States also produces and which are imported into this country only to a limited extent. Here is a brief discussion of each of these:

Canned Beef.—For many years the United States has been an importer of canned corned beef. Most of this originates in Argentina, Uruguay, and Brazil, where the product is a major export. These imports supplement domestic supplies of fresh beef, since there is practically no production of canned corned beef in the United States for commercial distribution.

Fruits and Vegetables.—Considerable quantities of fruits and vegetables are imported into the United States from Latin America. Some of the fruits are such complementary products as pineapples, bananas, coconuts, guava, and papayas; others are fruits which we also produce and which are imported largely in our winter season. In this latter field, as in many others, Europe was once a major market for Latin America and trade has been seriously disrupted by the war. This has been particularly serious to Argentina and Chile.

Cuba, Mexico, and Chile supply most of the fresh vegetables imported into the United States, and Chile and Mexico account for most of the dry vegetables. Lentils from Chile constitute one of the chief items of dried vegetable imports. Fresh vegetable imports are adjusted largely to seasonal demands in the United States. Among the vegetables imported are tomatoes, peas, eggplant, lima beans, peppers, cucumbers, okra, and squash.

Sugar.—Most of the sugar used in the United States is produced domestically, in United States Territories or in the Philippines. The only imports are amounts permitted to enter under quotas based on the Sugar Act of 1937. More than 95 percent of our imports of dutiable sugar come from Cuba, the rest from eight other Latin American Republics, which receive annual

(Continued on page 16)

More Trade Among the Americas

Latin America has long been a leading source of many agricultural products which the United States needs but cannot produce. The European War, curtailing trans-oceanic shipping, has increased our dependence on Latin America and pointed the way toward permanent expansion of our trade with our neighbors.

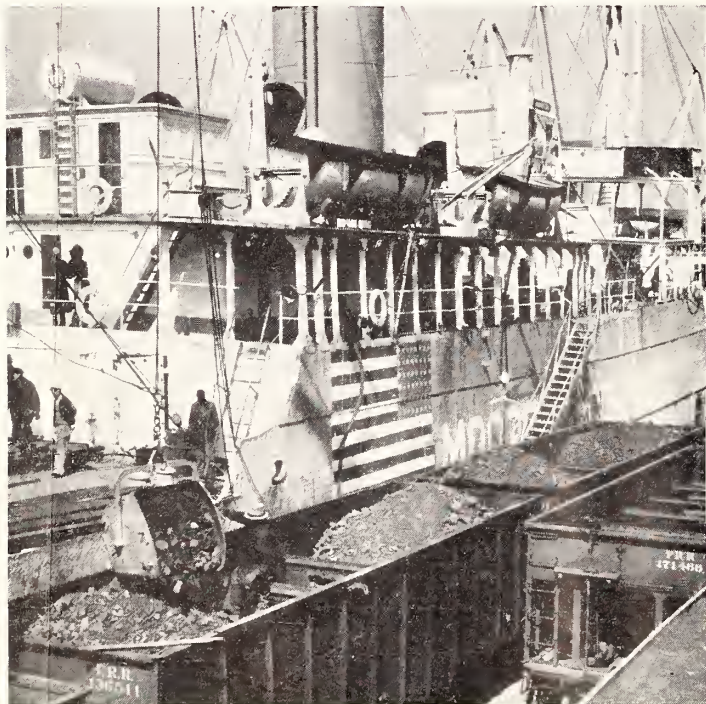
In return, Latin America is an increasingly good market for the manufactured goods of the United States. Almost every south-bound ship carries automobiles, radios, mining equipment, railroad coach and locomotive supplies, and a hundred and one other products of United States manufacture.

Pictures on these pages show shipment of some of the products that figure in inter-American trade.

All Photos by Palmer Pictures, Inc.



COFFEE, Brazil's greatest export, pours into with the east coast of South America.



MANGANESE, strategic wartime material, was formerly obtained from Eastern Europe. Now Brazil is proving a new and rich source.



SPECIALTIES that once came from Euro Willows (left) will be woven into baskets Pola (right) formerly came from France.



work from every ship trading



AUTOMOBILES are a major export to Latin America. More than 90 percent of the cars in use on South America's east coast are manufactured in the United States.



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l to sell us. Fancy cheeses



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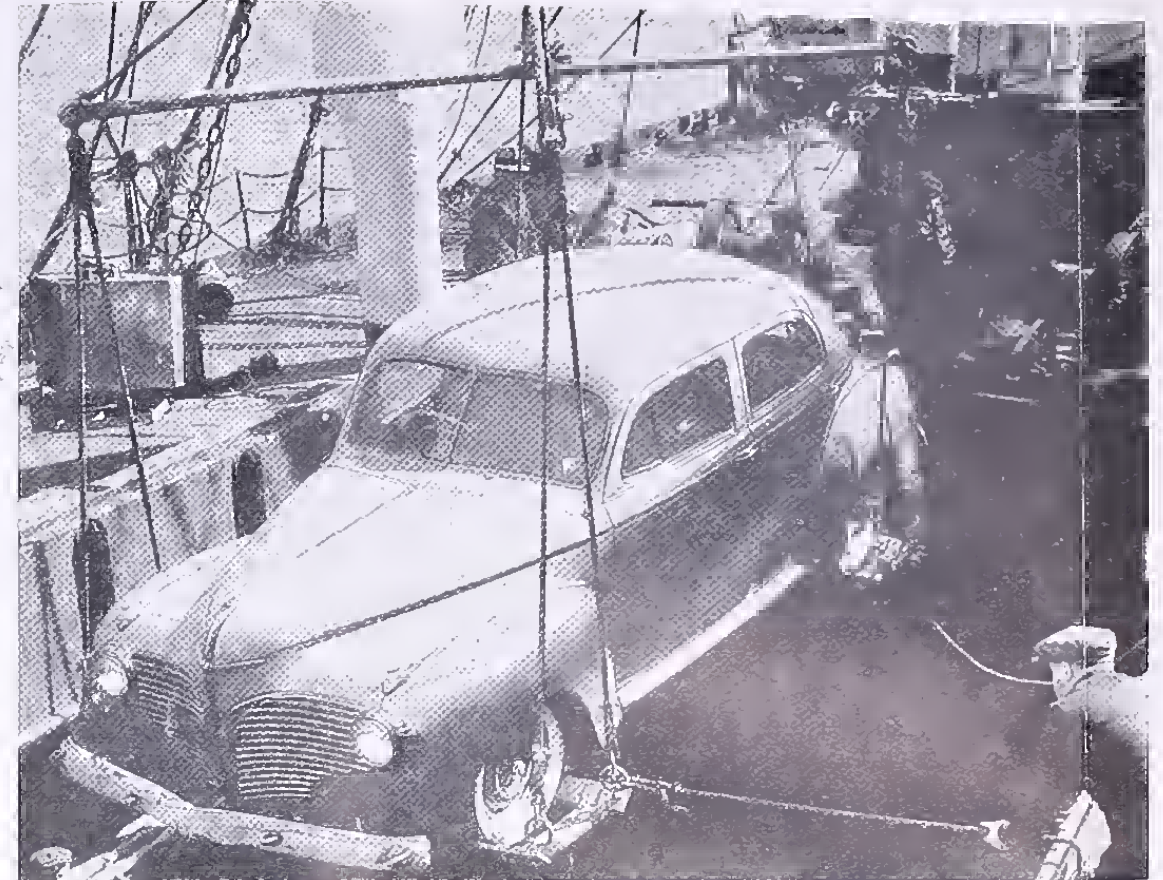
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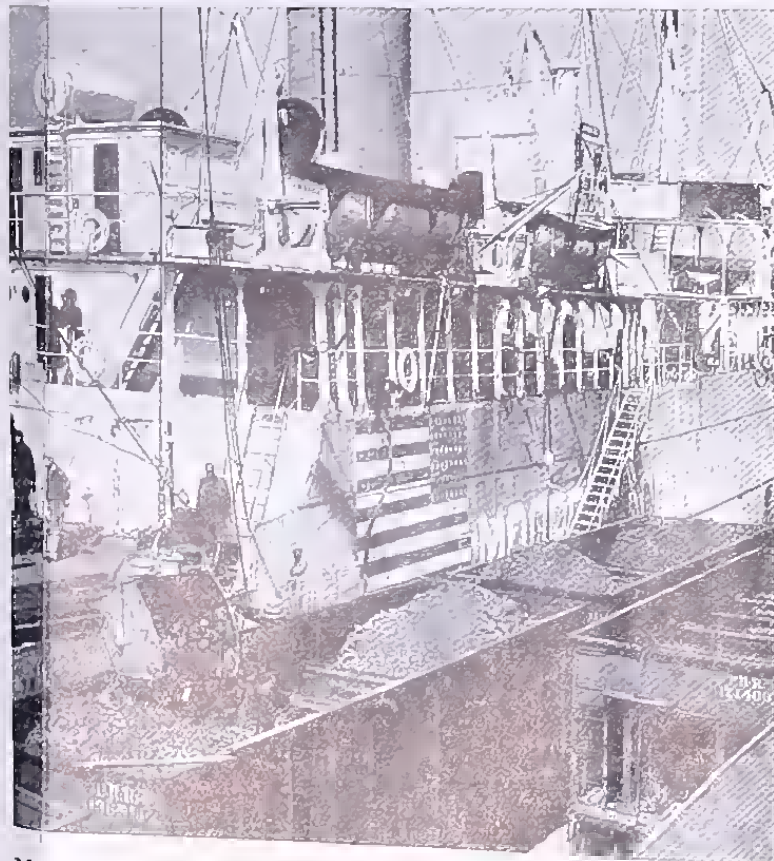
All Photos by Palmer Pictures, Inc.



COFFEE, Brazil's greatest export, pours into New York from every ship trading with the east coast of South America.



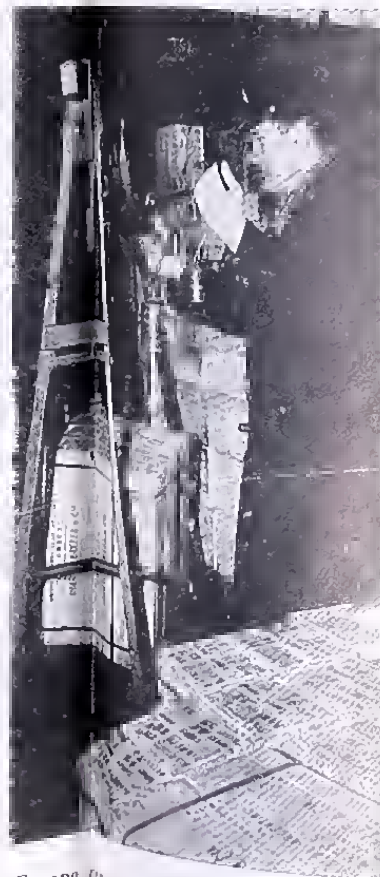
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COLOMBIA—

El Dorado

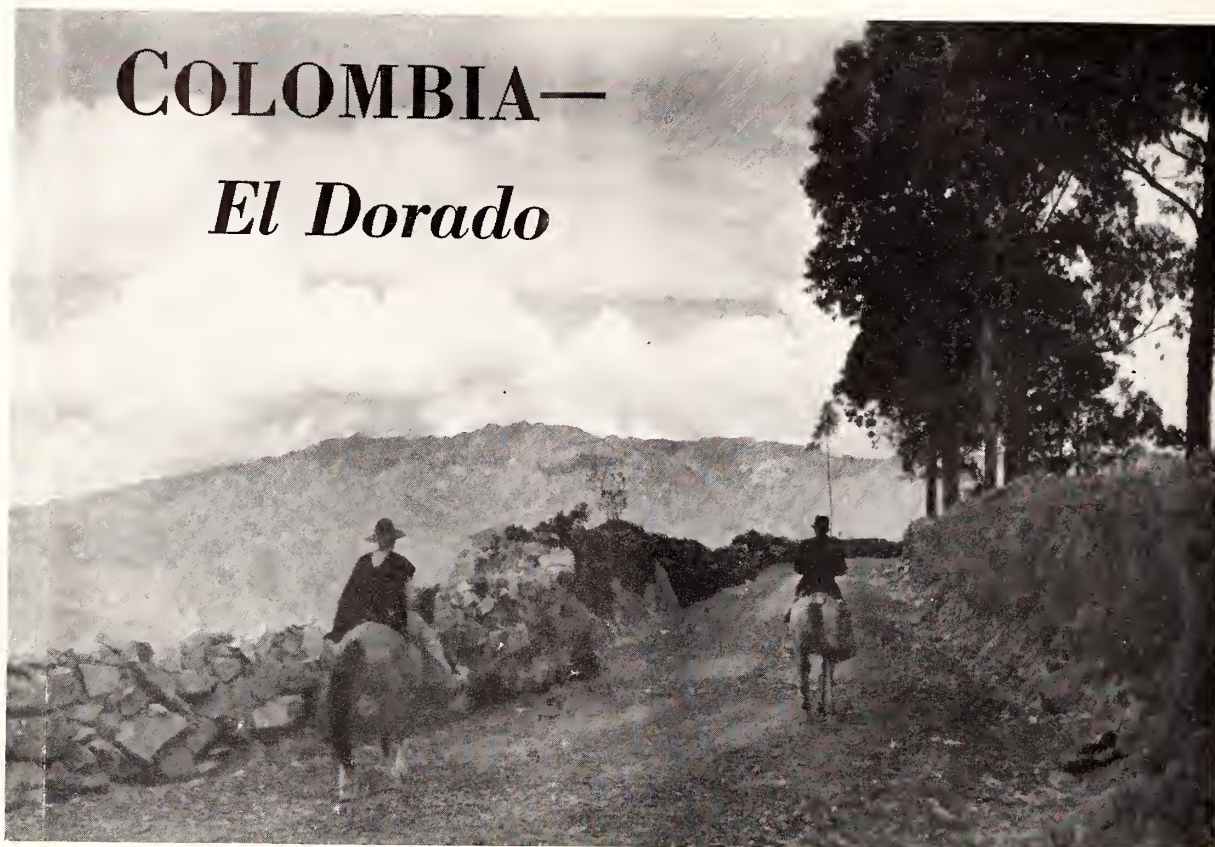


Photo by Foto-Almacen Lindner, Bogotá.

Typical Colombian countryside.

by PHILIP LEONARD GREEN

BY a peculiar twist of fate, the intrepid mariner, Christopher Columbus, never received adequate reward in his lifetime for his daring exploits. But one country in all the vast territories which he opened up to the Old World has rendered him a degree of poetic justice by naming itself after him. That country is Colombia.

It was in this part of South America that the legend of "El Dorado" originated. The Spanish explorers who first approached it were met by Indians telling of a native chief in the interior who bathed in a lake after covering himself with gold dust. Historical commentators are not quite agreed as to whether this practice was simply a method which the wily chief used for dramatizing himself to his people or was a ceremony with some religious meaning. Be that as it may, this unusual tale sharpened the lust for gold of the Spanish *conquistadores* and led them on to endure untold hardships.

That their valor did not go altogether unre-

warded can be easily seen when we learn that the Spaniards took out of the country about 6 billion dollars' worth of gold during the time they were its masters. Even today Colombia is South America's largest gold producer.

But this does not begin to tell the real "El Dorado" story. Colombia leads the world in the production of perfect emeralds. She also produces silver and copper, iron and tin, mercury, lead, nickel, and asbestos. Last but not least, there are large quantities of oil.

Colombia is a storehouse of potential agricultural manna as well. Because of the towering mountains, the country has within its borders almost every type of climate in the world. That accounts for the wide variety of agricultural products which she can grow.

Bananas, pineapples, sugarcane, and tobacco thrive in her tropical regions, while coffee is the main product in areas from 1,000 to 3,000 feet above sea level. From the 3,000-foot line to about 10,000 feet barley, potatoes, apples, and peaches do well. This is the land of everlasting

ring. So it can be seen that in Colombia climate and agriculture are largely matters of altitude. But let it not be thought that Colombia is mainly a land of mountains. She has vast plains, too, and many rivers.

Colombia has alternating dry and rainy seasons—two of each every year. The dry seasons last from December to February and from June to August, while the rainy periods are from March to May and from September to November. This is excellent insurance against too much rain or drought for most crops.

Besides its many crops, Colombia has a thriving cattle industry. As in agriculture and mining, the most developed section is the Cauca Valley. The grass of that region, growing on soil covered with volcanic ash, seems to be beneficial to the cattle that graze on it, and the valley is highly regarded for its beef-production possibilities.

This same volcanic soil is also good for coffee growing, as are the alternating seasons already mentioned. That is why Colombia's highlands produce some of the best mild coffees in the world, coffees that have brought fancy prices in New York and other coffee-buying centers. One of the important uses of Colombian coffee is as a blend with the stronger Brazilian types.

While coffee and bananas loom large in Colombia's export picture, there are many other products which either contribute to her prosperity now or could, with proper encouragement, be made to render a sizeable income. Among these may be mentioned rubber, quinine, balsams and gums, ivory nuts, divi-divi (a tanning agent), medicinal barks and roots, timber, and coconuts.

The Cauca Valley has been mentioned as being the most highly developed. But the Magdalena Valley, now largely virgin territory, offers a vast field for future growth. Incidentally, it is in this valley that the largest oil deposits have been discovered.

One of the greatest difficulties that had to be overcome was that of getting the oil from the wells to some point on the coastline whence it could be shipped abroad. An 8-inch pipeline was laid from Barranca Bermeja north to the Caribbean port of Cartagena (a distance of about 335 miles). This cost the company exploiting the oil fields at Barranca Bermeja a neat \$25,000,000. Even now, in order to get oil from this region to Cali, in southern Colombia, it is

necessary to ship it north to the Caribbean coast, then through the Panama Canal, then down the west coast to the port of Buenaventura, and from there inland to Cali.

This is an illustration of one of Colombia's most worrisome economic problems. Although the country has about 4,500 miles of roads and 2,150 miles of railroads, much remains to be done in providing adequate means for moving people and goods around the country.

Considerable progress is being made in this direction. The most dramatic achievements, of course, have been attained by the airplane. The trip from the Caribbean coastal city of Barranquilla to the capital, Bogotá, which used to take a week or more and involved considerable discomfort, can now be negotiated by a nonstop flight in as little as 2 hours. The line which traverses this route began its life under the leadership of a German air ace of World War I, Dr. P. P. von Bauer, who in 1919 founded the Sociedad Colombiana de Transportes Aéreos, known popularly as "Scadta." The company has been superseded by "Avianca," a subsidiary of the United States-owned Pan American Airways System. The latter now also operates an overnight air service from Miami to Barranquilla, thus bringing the formerly almost inaccessible mountain capital of Colombia within easy reach of the United States.

In addition to the raw products which already have been mentioned as contributing to the wealth of Colombia, there are certain manufacturing industries which also enter into the country's economic life. A few of the articles Colombia manufactures locally are beer, candles, cement, fique bags, cigarettes, ice, Panama hats, shoes, and soap. There is a large oil refinery, and several electric power plants operate within the Republic. While some of the products of these industries may not be important from an export standpoint, they do affect the internal economic life of the land. It is estimated that about 300,000 workers, skilled and unskilled, make their living through the employment afforded by these industries.

The principal products for export, however, still are such old stand-bys as coffee, oil, precious minerals, cattle and hides, bananas, and *tagua* (vegetable ivory) nuts. It is these and similar products which are mainly affected by the pres-



Modern business building—Bogotá.



Photos by Foto-Almacen Lindner, Bogotá.

Government building—Bogotá.



Photo by National Federation of Coffee Growers, Colombia.

Colombia's fertile Cauca Valley.

ent war. But Colombia is trying to develop new products for export as one of the solutions to this problem. Quinine, rubber, hemp, medicinal products, and ornamental plants have attracted considerable attention in this connection. Representatives of the United States Department of Agriculture have visited sections of Colombia where it is believed that rubber and quinine could be profitably cultivated.

Until these new products are developed, however, Colombia will have to depend on other measures for improving her economy. Toward this end she signed a reciprocal trade agreement with the United States some years ago. Colombia is also a party to the Inter-American Coffee Agreement signed by 15 American nations last year, and this has brought her higher prices for her main export product.

Colombia, with a population of almost 9 million, is not only an "El Dorado" in the material sense but also a gold mine of intellectual riches. Within her borders the old and the new contrast and blend in a delightful pattern. The people, who live mostly in the western half of the Republic, have preserved their Spanish heritage to a notable extent, although Indian influences have shown their effect in some regions, and descendants of African Negroes live along both coastlines. Colombia is the only South American country which has coasts on both the Atlantic and the Pacific sides.

Bogotá, the capital, is frequently referred to as "the Athens of America." It is an important publishing center. Poetic talent is visible and audible on all sides, among women as well as men.

Medellín, capital of the province of Antioquia, is another important center where Hispanic influences have been preserved. It is sometimes called a "Jewish" city because many of its original settlers were Spanish Jews. They or their immediate descendants, however, embraced the Catholic faith, and today the people of Medellín of Jewish descent cannot be distinguished from the balance of the population. Incidentally, Medellín is the resting place of Jorge Isaacs, outstanding writer of partly Jewish ancestry, whose novel "María," a picture of Colombian Catholic-Jewish home life, became a best seller (over 8,000,000 copies) in Spanish America.

Among other Colombian cities of importance

are Barranquilla and Cartagena, both ports on the Caribbean coast.

As might be expected from a country with such a cultural background, Colombia shows great concern over her educational problems. Not only are the usual channels of education carefully nurtured but particular attention is paid to rural education. The Colombian Government maintains about a hundred teachers who travel to country areas, bringing to people on the farms the simple knowledge they need in their daily lives—such as weights and measures, seed selection, the use of fertilizers, how to pack and ship their products, farm credit, and co-operatives.

Another name for Colombia's capital, Bogotá, is "the capital of liberalism." There, politics has become an advanced science.

In practical affairs this translates itself into one of the most democratic regimes in the Americas. While Colombia, during her early years as a Republic, did not escape tyrants and internal dissension, she has not had a revolution for the last 40 years!

Her devotion to the principles of democracy is of the greatest interest to the United States when we consider that parts of the border between Colombia and Panama are less than 150 miles from that vital artery, the Panama Canal. Recently the President of Colombia declared that no attack on the Canal from Colombian territory would be permitted.

Thus, in this historic hour, Colombia, nearest South American country to the United States, ranges herself alongside other democratic American nations in defending on an international front the principles which she has furthered in her own national life for many years.

•

Hipolito Unanue, national hero of Peru, was also a distinguished physician.

•

The coca leaf, from which the drug cocaine is obtained, grows extensively in Peru and Bolivia.

•

Sharks, swordfish, and tarpons, all salt water fish, are found in Lake Nicaragua, a fresh water lake in Central America.

•

Balsam of Peru, an important pharmaceutical product, is found only in the Republic of El Salvador.

READING *About The Americas*

This department has been established because of the numerous requests for suggested reading material on the Americas received by the Office of Foreign Agricultural Relations. It will appear frequently and will not necessarily be confined to current publications. Because of space limitations, comments will be brief. Inclusion in or omission from the list should not be regarded as appraisal. Listing is alphabetical by authors.

The All American Front, Duncan Aikman; 344 pp., Doubleday-Doran and Co., New York, 1940. One of the best popular works on inter-American relations.

America South, Carleton Beals; 599 pp., J. B. Lippincott Co., Philadelphia, 1937. Devotes considerable attention to racial, religious, and social questions.

History of the Americas, Herbert E. Bolton; 365 pp., Ginn and Co., Boston, 1935. A syllabus for study of colonial and republican America. Stresses unity of Americas in their historical development. Contains list of lectures, maps, reading plan, topical readings, and list of atlases.

South American Primer, Katherine Carr; 208 pp., Reynal and Hitchcock, New York, 1939. Deals with colonial times, the land and the various South American Republics singly and has one chapter on relations with the United States.

The South American Handbook, Howell Davies, Ed.; 678 pp., Trade and Travel Publications, Ltd., London (United States agents, H. W. Wilson Co., New York), 1941. A guide to the various Latin American countries and colonies.

Latin America, Stephen Duggan; 62 pp., World Peace Foundation, Boston, 1936. Sketches geography, resources, history, education, industry, foreign influence, social problems and inter-American relations.

Neighbors to the South, Delia Goetz; 302 pp., Harcourt, Brace and Co., New York, 1941. Describes geography, commerce, industries and customs of 12 countries: Argentina, Brazil, Chile, Costa Rica, Cuba, Guatemala, Haiti, Mexico, Nicaragua, Panama, Peru, Uruguay. Also has general chapters on culture, commerce and inter-American relations.

Our Latin American Neighbors, Philip Leonard Green; 182 pp., Hastings House, New York, 1941. Outlines racial, geographic, economic and political influences shaping Latin American thought and action. Deals with Latin American psychology, youth movements, cultural and scien-

tific contributions and forces for unity and disunity. Lists sources for additional information.

Latin America, Its Place in World Life, Samuel Guy Inman; 402 pp., Willett, Clark and Co., Chicago, 1937. Gives considerable attention to racial questions, revolutions, spiritual aspects and the new order. Bibliography, chronology.

An Introduction to Hispanic American History, Tom B. Jones; 577 pp., Harper Brothers, New York, 1939. A history for beginners, with a chapter on inter-American relations and a bibliographical note.

South of Yesterday, Gregory Mason; 401 pp., Henry Holt and Co., New York, 1940. Deals with the Mayas and the Taironas.

Look at Latin America, Joan Raushenbush; 63 pp., Foreign Policy Association, New York, 1940. Short account of land, people, riches, industries, foreign influences, transportation, commerce, social welfare and defense. Maps and charts.

Economic Geography of South America, R. H. Whitbeck and Frank E. Williams; 469 pp., McGraw-Hill Book Co., New York, 1940. New edition of an old authoritative volume. Deals with South American economic geography as a whole and of individual countries. Bibliography, maps and illustrations.

The Development of Hispanic America, A. Curtis Wilgus; 941 pp., Farrar and Rinehart, New York, 1941. Latest scholarly history volume in the field. Gives background, recounts discovery, exploration, conquest, colonial development, revolutions for independence, modern development and international relations. Helpful appendices: glossary of Spanish and Portuguese terms and outlines of Hispanic-American constitutions. Biographical essay and chart, "The Americas at a Glance."

America Faces South, T. R. Ybarra; 321 pp., Dodd, Mead and Co., New York, 1940. Popular treatment, based on first-hand observations by a well-known United States writer of Venezuelan ancestry.

ALONG THE AGRICULTURAL FRONT

INTER-AMERICAN EDUCATION DISCUSSED

The committee on Inter-American Cooperation in Agricultural Education, at its second conference in Washington recently, endorsed unanimously the Institute of Tropical Agriculture; increased scholarships for Latin American agricultural students in the United States; larger extension services in Latin America; further research on Latin American educational institutions; development of Latin American civilization courses in agricultural institutions in the United States; and the exchange of agricultural information through publications, radio, and motion pictures.

Appointed by President Roosevelt, the committee strives to facilitate inter-American cooperation in agricultural education. It plans to hold its next conference to coincide with that of the American Association of Land-Grant Colleges, where discussions will be held on nutrition, livestock, and surplus products.

UNITED STATES REPRESENTATIVE NAMED

Dr. Earl N. Bressman, Assistant Director of the Office of Foreign Agricultural Relations of the U. S. Department of Agriculture, has been designated by President Roosevelt as the United States representative on the Inter-American Commission on Tropical Agriculture.

This commission was created on recommendation of the Governing Board of the Pan American Union to plan for the establishment of an Inter-American Institute of Tropical Agriculture and to encourage rubber production in the Western Hemisphere. Until Dr. Bressman's appointment, it had no United States representative. The commission is headed by Dr. Héctor David Castro, Minister to the United States from the Republic of El Salvador.

RUBBER NURSERIES FOR PERU

Over a million rubber trees from seeds and grafted buds will be planted in two Peruvian Government nurseries during 1941. The stations are at Tingo María and Oromina, the latter being

the site of an experimental rubber plantation abandoned some 20 years ago, following the collapse of the Amazon River rubber industry.

The establishment of the stations, under the direction and supervision of the Peruvian Director of Agriculture, Pedro Recavarren, is the outcome of a United States mission to Peru made in 1940, headed by Dr. E. C. Stakman, Bureau of Plant Industry, United States Department of Agriculture, to study Latin American rubber cultivation possibilities.

ANOTHER PAN AMERICAN DAY

Second community Pan American Day in the United States Corn Belt was that at Hamburg, Iowa, late in May. Like the earlier similar



event at Greenfield, Iowa, it was arranged by local groups and drew a large crowd. This picture shows a portion of the crowd watching the parade.

BOOST FOR COMPLEMENTARY PRODUCTS

Two men who are firm believers in the development in Latin America of crops which complement the agricultural production of the United States have been named recently to the highest agricultural positions in their respective countries.

Newly appointed as Secretary of State for Agriculture, Industry and Labor for the Dominican Republic is Emilio Espinola, who is expected to promote new crops for the Republic,

such as essential oils and some of the vegetable oil crops, and an extensive reforestation program, using Venezuelan mahogany, teakwood, balsa and bamboo and the West India pine for such mountain plantings.

Haiti's new Minister of State for Agriculture, Education and Labor is Maurice Dartigue, a graduate of Columbia University with technical training in agricultural research and education. He is expected to play an important role in the program for development of new crops in Haiti, which was discussed in *Agriculture in the Americas* last month.

DAIRY INDUSTRIES SURVEY

Good progress in the program to broaden the development of the dairy industry in the Western Hemisphere is reported by the Inter-American Committee for the Dairy Industries. Fifteen American Ministers of Agriculture have accepted membership on the Council of Sponsors.

The Committee is now compiling basic information from questionnaires sent to Latin American Ministries of Agriculture, and has been assured by the State Department of the cooperation of the United States consular agents in obtaining needed information. To date, some 600 sources of information about the dairy industry in Latin America have been investigated, with more than 1,600 other sources listed. Information and exhibit programs have been launched.

After 6 months of systematic work, the Committee reports that its objectives appear of "great significance to the health of the infants and children of the Americas, to the social welfare of the entire population of the Hemisphere and to agricultural and industrial advance in all the lands of the West."

Brazil, Cuba, Ecuador, El Salvador, Mexico, Uruguay, and the United States are the American Republics that have woman suffrage.

Foods—

(Continued from page 7)

quotas. Cuba and Peru are the only Latin American countries that consistently fill their quotas. Because of low prices of the last 10 years, there is some form of government sugar control in practically every Latin American producing country. The problem has been accentuated by the fact that Great Britain—normally the area's principal sugar market—has reduced its purchases as a result of the war.

Cottonseed Oil.—During the last few years cotton has become increasingly important in Brazil's economic life, and it now produces about one-fifth as much cottonseed as does the United States. Its normal outlets for exports have been Denmark, Germany, and Belgium, all of which presumably are now out of the market. United States imports of cottonseed oil have never been significant. They were largest in the years immediately following the 1934 drought, which reduced domestic lard supplies and widened the use of vegetable shortenings, the chief ingredient of which is cottonseed oil.

Cattle.—Mexico is the only Latin American exporter of live cattle to the United States. These imports are mainly stocker and feeder cattle sold for further finishing in the United States. The extent of imports varies closely with the level of United States prices and has never amounted to more than a small fraction of 1 percent of United States cattle numbers.

Argentina and Chile rank among the first six wine-producing countries of the world.

Methods and techniques used in rural United States by the Rural Electrification Administration of the United States Department of Agriculture are now being studied by Central and South American engineers. The group from Latin America will spend a year in the United States as student-members of the REA's staff.

Vol. I

Robert H. Ingram, Editor

No. 7

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Contributing authors are staff members of the Office of Foreign Agricultural Relations unless otherwise designated.

Carlos N. Brin—*Our Mutual Friend*

SITUATED at the junction of Central and South America, parted in the middle by the Panama Canal, the Republic of Panama is these days a focal point of the defense-minded Western Hemisphere. There is little rest for its diplomatic representative in Washington.

Its Ambassador, fortunately, is no stranger to the busy life of a man with important work to do. As one of Panama's leading surgeons, Dr. Carlos N. Brin has been used to tense, high-pressure living for many years.

Dr. Brin was born in Panama 47 years ago. He studied at La Salle College in Panama, at Upper Canada College in Toronto, and at George Washington University in Washington, D. C., where in 1916 he was graduated as a Doctor of Medicine.

In the same year he joined the staff of the Santo Tomás Hospital in Panama City, where he later became chief of the eye, ear, nose and throat surgical section, following post-graduate studies in the United States and Europe. In recent years he has been chief surgeon of the hospital.

Dr. Brin's first diplomatic post was Minister with the duties of Counsellor at the Panama Legation in London, to which he was appointed at the time of the coronation of King George VI.

Among his offices in the Republic of Panama have been President of the National Board of Hygiene, Medical Captain of the Panama Fire Brigade, Honorary Captain of the National Police, Director of the School for Nurses and member of the Board of Directors of Santo Tomás Hospital. He recently was elected to the Board of Directors of the National Bank of Panama. As Panama's Ambassador, he is a member of the Governing Board of the Pan American Union.

He has been decorated with honor awards of two Latin American Republics—the *Gran Cruz de la Orden de Vasco Núñez de Balboa* of Panama, and the *Busto del Libertador* and *Medalla de Instrucción Pública* of Venezuela.

He was appointed Ambassador Extraordinary and Plenipotentiary to Washington in December 1940.



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Agriculture IN THE *Americas*



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September 1941

OFFICE OF FOREIGN AGRICULTURAL RELATIONS
UNITED STATES DEPARTMENT OF AGRICULTURE

Summing Up . . .

SOME people, infected with the deadly virus of pessimism, insist that inter-American cooperation in agriculture is impossible. "The United States and Latin America," they say, "are natural competitors and can never be anything else." These skeptics overlook both the physical and economic factors that make inter-American agricultural cooperation possible and the realities of today that make it essential. What is more, they ignore the fact that such a program, perhaps the greatest example of international agricultural cooperation in the world's history, is already in full swing. If they have any knowledge at all of the current program, they have got their information in stray bits that they cannot fit together and the trees block their view of the forest.

That is why the following summary of the Department of Agriculture's activities in the inter-American field seems worth reproducing. Prepared for the Coordinator of Inter-American Affairs, it summarizes effectively both the immediate and long-term objectives of the inter-American agricultural program:

- Protection and maintenance of existing agricultural industries of the Americas through cooperative research designed to (1) prevent, control, and eradicate the diseases and pests which attack livestock and plant life of the Americas; and (2) improve the quality of present livestock and plants through the development of species or types more adaptable to particular environments and more resistant to diseases or pests.
- Technical and scientific assistance looking toward (1) development and expansion in Latin America of complementary and noncompetitive products that may serve to widen the basis of inter-American trade, and (2) attainment of agricultural diversification in Latin America, particularly along the lines of subsistence crops, thus raising both living standards and earning power.
- A common management of agricultural surplus crops of the Western Hemisphere through forms of cooperation that will result in (1) more orderly production and marketing; (2) increased consumption in the Western Hemisphere through commercial and relief channels; (3) provision of more adequate storage facilities for surplus crops; and (4) new industrial uses for farm products.

PLANTS AMERICA GAVE THE WORLD



Photo courtesy Grace Line.

Urú Indians of Bolivia making boats of balsa—a native American wood.

by EDGAR R. BURKLAND

IF YOU enjoy your dinner tonight, don't give all the credit to the cook. Give part of it to the earliest native Americans. Because if some avenging Inca or Aztec god were to snatch away all the products the Americas gave the world, perhaps half the meal—from the tomato juice cocktail to the after-dinner cigar—would be missing from the menu.

These earliest Americans, although not farmers in the conventional sense, were ingenious agriculturists, who contributed heavily to modern life. In military equipment, the natives were as inferior to the Spanish *conquistadores* as a Zulu tribe is to a mechanized division, but in the art of wresting a living from the land some of the Indian nations were ahead of any European country of their time.

The Indians of the region now called Peru were not only skilled in irrigation and land reclamation, but were diligent in the cultivation of agricultural plants, domesticating from 70 to 80 different species in pre-Spanish times. They

had root and seed crops, fruits and vegetables, pot herbs, condiments, medicinal plants, intoxicants, poisons, dyes, fibers, and many ornamental plants.

Many of the plants the Indians domesticated have vanished into limbo. On the other hand, a large number which we regard as essential to modern living survived. Not only did these plants make possible the settlement and development of the New World but they spread rapidly to the Old, bringing undreamed-of comforts to civilization everywhere.

Leading the parade of outstanding American natives in the agricultural field—not known in Europe and Asia until the Western Hemisphere was discovered—is corn, which may well be the oldest of all cereals. How long it took the Indians to develop corn or maize from its wild ancestor—possibly a tropical grass—nobody knows. At any rate, develop it they did and it was an agricultural staple with them from Canada to Patagonia.

In writing of corn cultivation by the Indians,

an Englishman named Wood said in his "New England Prospect" in 1629: "They exceede our English husbandman, keeping it so cleare with their Clamme-shell hoes as if it were a garden rather than a corne field, not suffering a choaking weede to advance his audacious head above their infant corne."

Some say the Indians had even more varieties of corn than the great number grown today. They definitely contributed the flint corn of New England and Argentina, the dent corn of the Middle West, and popcorn. With the American natives, corn was more than a staple food. The Aztecs of Mexico brewed a beer called *tizin* from maize. In Central America, the modern Mayas still hold "maize masses" at corn-planting time—religious ceremonies that also have a social side comparable with the corn-husking bees of the United States Corn Belt.

Closely associated with corn cultivation in early America were beans, pumpkins, and squash. These plants were grown between corn rows over large areas from the St. Lawrence to the La Plata. Several sorts of squash are exclusively American natives, as are lima, kidney, and some other types of beans.

Both sweet and Irish potatoes are native to the Americas. In prehistoric times white potatoes from high altitudes were preserved by freezing and drying, as they still are, and carried down the eastern valleys on the backs of llamas to be exchanged for the drug coca, but they never grew in America north of Colombia until Irishmen brought them to Londonderry, New Hampshire, in 1719 after one of the most remarkable boomerang voyages any vegetable ever accomplished.

The first white man to see the Irish potato is said to have been Pedro de Cieza de León in the Cauca Valley in Colombia. He found the natives living well on the tubers—referred to as a "kind of ground nut, which when boiled became as soft as a boiled chestnut." Later, Spanish ships took potatoes to Europe where they were introduced to Germany and England and finally to Ireland in the 17th century. From Ireland they were again brought back to the New World.

The sweet potato, considered the true potato, is a member of the morning-glory family. The

plant was probably first encountered by Europeans in the West Indies, when the natives gave the men of the Columbus expedition some boiled roots, described by the Spaniards as "not unlike chestnuts in taste." (Great chestnut fans, those early Spaniards!) The sweet potato became very popular with the white explorers and was soon transplanted to Europe, where it did well in Spain and Portugal.

Although there is some doubt about the exact place of origin of cacao, there is no doubt that America added it to the world's food store. (Cacao is the Spanish name of the tree and the bean it bears; to add to the confusion, the English word cocoa is applied seldom to the tree, often to the bean, and always to the dry powder of the bean, from which chocolate is produced.) Some say the cacao tree originated in the Amazon basin of Brazil; some place it in the Orinoco basin of Venezuela; and others in Central America.

When the Spanish *conquistadores* arrived, they found the tree cultivated so widely in Mexico that they believed it to be native to that region, and the word chocolate is of Mexican origin. Many, however, believe the tree originated in South America and was transplanted into Mexico before the Europeans arrived. At any rate, the tree grows wild today in the Amazon Valley of Brazil and the Orinoco Valley of Venezuela.

In the ancient Aztec civilization, cacao had three chief uses: The prepared chocolate drink was used as a food; the cacao bean was a medium of exchange; and both the tree and the bean figured in the Indians' religious ceremonies. The tree was also woven into the Aztec legends in which it is represented as of divine origin. *Quetzalcoatl*, mystic gardener of paradise, was supposed to have brought the first seeds from paradise.

Today, millions of South Americans drink *mate*, brewed from the leaves of a native Paraguayan plant of the same family as our common holly. Sometimes known as "Paraguay tea," it is gaining in popularity in other parts of the world.

One of the most widely grown of all crops native to the Americas is the manioc root

(Continued on p. 4)

Americans Were the First to Grow . . .



Life Magazine Photo.

TOBACCO

The Smoker: An Argentine Gaucho.



A. A. A. Photo.

CORN

The Feeder: A South Dakota Farmer.



PEANUTS

The Eater: A Foster American.



F. S. A. Photo.

TURKEY

The Carver: A Connecticut Householder.

(known also as yuca, mandioca, and cassava), which grows well in every tropical country of the world and forms the chief item of diet of millions of people. It is said to yield six times as much food per acre as wheat. In the United States it takes the form of industrial starch and edible tapioca and is used also in the manufacture of dextrine, glucose, ethyl alcohol, mucilage, and other chemical products.

In its raw state, the root is poisonous, and it was the American Indian—a practical fellow with an aversion to being dead—who devised an ingenious method of preparation that made it edible. This consisted of grating the root, squeezing it in a basketry press, and rinsing it in water to remove part of the poison. The pulp was then formed into cakes and baked to drive out all the volatile poison. What was left was cassava bread, a staple food among many South American tribes today, as it has been for hundreds of years.

The people of the United States (plus presumably the animals in its zoos) consume upward of \$40,000,000 worth of peanuts a year, and annual U. S. production exceeds a billion pounds. Thus another local plant has made good, for the peanut is a native of Brazil and Uruguay and numerous specimens of peanuts have been found in prehistoric graves unearthed in Peru. From South America it was introduced into Europe and since has spread to nearly every warm climate of the globe.

The peanut was another American boomerang, like the potato, having been brought to the United States by Negro slaves imported from Africa. Now it is a major crop in the South. Incidentally, the use of peanuts for roasting and eating as a confection is chiefly American. Elsewhere the nuts are used almost entirely for making oil and for livestock feeding.

One of the most important contributions to the New World was rubber, product of the native American tree family called Hevea. It was known to the Indians of tropical America, who used it for making such articles as rainproof wearing apparel, battle shields, and rubber balls used in games.

What European first saw rubber in use by the Indians still remains a moot question. Some hold that Columbus noticed the aborigines of

Haiti playing with rubber balls when he visited the island during his second voyage, while others say that Cortés gained the distinction in Mexico in 1519.

Another rubber-producing plant native to the northern part of Mexico and southwestern United States is the guayule rubber shrub. It is the only subtropical plant that has been found practical for producing rubber in commercial quantities. Gums of a somewhat different sort are chicle, the chief ingredient of chewing gum, which is extracted from the sapodilla tree, a native of Mexico and Central America; and balata, an elastic raw material used extensively in machine belting and telephone cables, which is produced from a tree that originated in the Caribbean region.

Cotton as Fine as Silk

Although cotton was probably the most important fiber with the Indians and the Mayas and Mexicans grew cotton so fine that the Spaniards mistook it for silk, it is not an exclusively American native. It is indigenous to the eastern world as well. However, it is from American cotton that three of the most important types of modern commerce, American Upland, Sea Island, and the misnamed Egyptian, were developed.

Two hard fibers that are important commercially are sisal and henequén, derived from plants native to the State of Yucatán, Mexico. As a cordage fiber, henequén is second in importance only to Manila hemp.

The kapok tree is another native of the American tropics and yields a soft flexible fiber used to stuff pillows, mattresses, and chairs. In addition, kapok is now used in making life preservers, water wings, sleeping bags, and insulation material. In Ecuador a fiber plant with the scientific name *Carludovica palmata* has for many years been the basis of the Panama hat-making industry.

In the high altitudes of Peru and Bolivia where cotton could not grow, the alpaca furnished wool for wearing apparel and rugs, and its story is worth a brief digression from the plant field. The alpaca and the llama, the latter used as a beast of burden, were domesticated from wild animals of the Andean region and

their relatives, the guanaco and the vicuña remain in the wild state today. Both of them are so precisely bred for high altitudes that they have never been raised successfully in other parts of the world.

Museums in Lima, Arequipa, and La Paz have extensive collections of fine articles woven from alpaca wool by the ancient Incas hundreds of years ago. In addition to furnishing wool, alpacas were also offered as religious sacrifices. One writer claims that as many as 800,000 were so used every year at Cuzco alone.

Practically no other animals and few birds were domesticated in early America, but one of the latter, the turkey, has reached commercial importance everywhere in the world. The turkey is a native of Mexico, where it was prized for its fine feathers more than for its meat. The history of the turkey is written in native American lore in codices, legends, and pottery designs.

To return to our native plants, the tomato is an American contribution to the world's palate, although its "world premier" was somewhat less than colossal. In fact, it was greeted with indifference, if not outright hostility. The plant came from western South America, whence it was introduced into Europe in the 16th century. Everyone agreed that it made a dandy garden ornament, but nobody was much interested in eating it. Some people said it was poison. Around 300 years passed before the tomato came into much culinary use, and that chiefly for pickles and preserves. In the century or so since then, careful plant breeding has made it one of the most popular vegetables of the United States, where it is more widely grown than in any other country.

Some of the best gifts of the New World are fruits and nuts which grew wild in such profusion that the Indians did not bother to cultivate them. In 1615 Champlain saw the Indians near Lake Huron gathering blueberries for their winter stores. North America also contributed the red raspberry, the blackberry, and the huckleberry, while tropical America gave the world the pineapple, the avocado, the guava, and many other fruits less widely known.

The pecan is a native of southern United States and Mexico, and DeSoto mentions its use by the Indians along the Mississippi. The cashew and the Brazil nut are natives of the

South American jungle. The sunflower, an American native of no great commercial importance today, was a food plant to the American Indians, who obtained from the seeds both flour and an edible oil.

The world owes tobacco to the Americas. Originally the "weed" was tropical, but its use spread until at one time it was probably cultivated more widely than maize. Among early Indian tribes, tobacco was smoked, eaten, and drunk. It was considered good for the health and was used by young and old of both sexes. Even today, semiliquid tobacco is eaten or drunk by the Kagaba-Arauco Indians of northern Colombia, who carry it about in a viscous state inside a small gourd.

The first European to see tobacco was Christopher Columbus, who found the natives of the West Indies fond of cigars. In middle America, a leaf was rolled into a rude cigar and then pushed into a hollow holder of wild cane. The reed developed into a tubular pipe of stone, wood, or pottery, which was held vertically. Indians in what is now the central and eastern part of the United States are credited with adding the bowl at the end of the pipe stem.

Drugs—Good and Bad

Drugs, both good and bad, were known in early America. One of the most illustrious was quinine, a product of the cinchona plant. In the Quichua tongue, language of the Incas, the plant was known as "quina-quina," repetition of the name indicating that it was regarded as having curative powers.

The modern history of the plant goes back to 1638, when the Countess of Chinchon, wife of the Spanish viceroy in Peru, was cured of a malarial fever by drinking a tea made from the bark of the cinchona tree. The countess carried a supply with her to Spain 2 years later and so introduced quinine to Europe.

Another American drug is the powerful narcotic cocaine, which comes from the coca plant (not to be confused with the cacao tree). The native home of the coca plant is in South America. In the days when the Incas reigned over a vast area of the Andean region, coca leaves were much esteemed by the natives. As a stimulant they gave added strength and fortitude. At

athletic contests victors were rewarded with leaves which were supposed to contain marvelous strength-producing powers. The leaves were also used as offerings to the sun and at death were placed with the body of the deceased.

Since then the use of cocaine, derived from the leaves, has spread to the far corners of the world. It has been both acclaimed as a blessing and denounced as a curse. In defense of the plant, there is quite a little evidence that the first use of local anesthetics was in South America, probably in the Inca region, and that the drug used came from coca. Today about 60 percent of U. S. imports of coca leaves are used in the soft-drink trade after the cocaine has been extracted.

Vanilla, product of a species of orchid, is another American gift. It was unknown to Europeans until Spaniards found it growing in Mexico, where the Indians used it as a flavoring

for cocoa. It was first imported into Europe about 1510, when other Mexican plants found their way overseas. Development of the flavoring quality of vanilla is also an American contribution, for the slender pods we know as vanilla beans are not naturally fragrant. The aroma is due to a volatile oil, vanillin, which is developed by slow curing and fermentation.

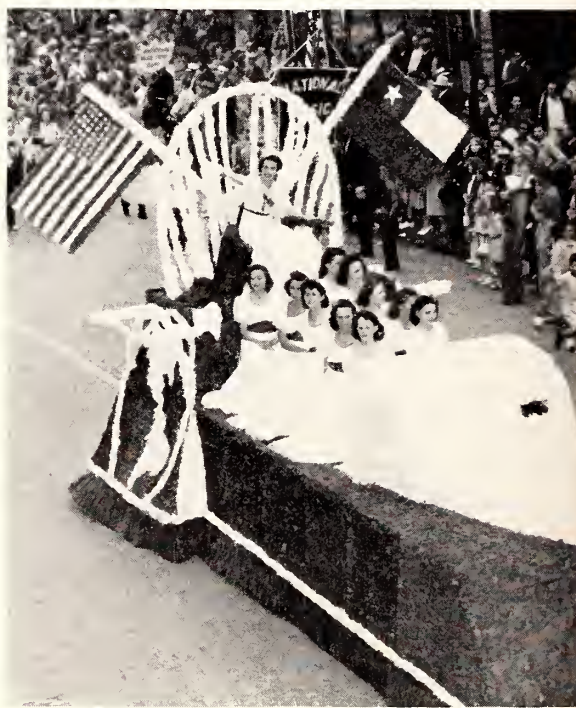
Quebracho, the world's most important tanning material, is the name of a tree native to Paraguay and Argentina. It is one of the hardest known woods, as suggested by its name, derived from the Spanish *quiebrahacha*, meaning "ax-breaker." The red variety of quebracho is the principal source of tannin, used in preparing fine leathers. White quebracho is used for wood engraving and its bark contains an alkaloid, quebrachin, which is used as a remedy for asthma. The wood is used for railroad ties,

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A Chilean Señorita Goes to the Cherry Festival



Señorita Cristina Michels, daughter of the Chilean Ambassador to the United States, enjoyed a 3-day reign as "Queen" of the recent National Cherry Festival at Traverse City, Mich. She and her father, Rodolfo Michels (above), arrived by plane bright and early on the first day of the fete. Later . . .



. . . Queen Cristina and her court, enthroned on a floral float, greeted Cherryland crowds along the parade route. Ambassador Michels was chief speaker at the Festival, pointing out common interests between Chile and Michigan. Event is held annually during northern Michigan's cherry harvest.

CHILE LOOKS AHEAD

by PHILIP LEONARD GREEN

LA *ARAUCANA* is a poem which Chile treasures. It is a genuine contribution to the treasure-house of the world's epics. Written by the Spaniard, Ercilla, at the time of the Conquest, it is accounted by many as the first worthwhile literary effort of the New World. It describes vividly the fierce struggles between the Spaniards and Chile's native Indians, the Araucanians.

No place else in the Americas did the Indians put up such a stiff resistance to the invaders as in Chile. The Araucanians have been frequently compared to the Iroquois of North America. Unlike other South American Indians, they were never fully beaten by force of arms alone. White man's diseases and white man's liquor, combined with other forces, brought about their decline. Yet today about 30,000 of them still exist. This brave race has left an indelible mark on the human geography of the Chilean nation.

The energy which characterizes Chileans can also be traced to the type of Spanish settler that the rugged country attracted. The hardy Basques, known far and wide for their industry, thrift, and tenacity, gave to the young nation the qualities that have stood it in such good stead throughout the years. This does not mean that the only Spaniards who came to Chile were Basques any more than all the Indians found there were Araucanians; but this combination of races acted as a leaven, in the same sense that the Puritans did during "the flowering of New England." In fact, through this fusion of hardy stocks and the addition of new ones from Europe, such as the English, German, and Irish, there emerged a new people called by many "the Yankees of South America."

This doughty nation inhabits a country frequently likened to a shoestring because of its shape. About 2,700 miles long, it is only about 220 miles across at its widest point.

Like Caesar's Gaul, it is divided into three parts, each with characteristic products. Beginning in the north (from 18° to 27° South Latitude, to be exact) are the arid regions where

nitrate, borax, and sulphur deposits are found in large quantities.

Then comes that part of Chile where minerals abound—gold, silver, copper, nickel, lead, manganese, and others. It stretches from 27° to 30° South.

Then there is a third part, the upper portion of which starts at 32° and ends at 42°. It is in many ways the most important. Within these 10 degrees, from the Andes to the coastal range, stretches the rich, fertile Central Valley, crossed by many swift-running streams which lend themselves to the development of water power. Here is the bounteous garden spot of Chile, blessed with a temperate climate. In this strip, barely 500 miles long, never more than 150 miles wide, are some of the most fruitful farming lands known to man. Here one finds a surface layer of almost incredibly rich, dark soil which varies in thickness from 3 to 300 feet! It has never been hard to grow all sorts of fruits and grains here. Wheat, corn, barley, beans, potatoes, and lentils come from this bountiful valley. The lentils, particularly, are well known in New York's markets. From this region, too, come chickens, cattle, hogs, and prize-winning horses.

South of the Central Valley are the well-known, picturesque lake regions, "the Switzerland of South America," thousands of islands and thick forests, opening up in the extreme south to the great sheep regions of Tierra del Fuego. It was to this southern region that large colonies of German settlers came. Here German-style dwellings and school buildings still give the countryside an unmistakable Teutonic stamp, while German faces are everywhere in evidence. Small industries have been built up and have prospered in this part of Chile.

The lake region is also one of the most attractive to foreign visitors among whom skiing and other winter sports have their followers. In fact, some writers observe that this part of the country is probably more appreciated than any other by those who come from abroad for rest and recreation. Hotels in the region have made every effort to provide comfort and enjoyment to visitors. Chilean posters advertising the at-



Photo courtesy Grace Line.

Volcano Osorno in Chile's lake district.

tractions of the region have become familiar to travelers. Many are at last coming to realize that our own Americas have natural beauties and wonders which equal and often exceed those of traditional playgrounds in other parts of the world.

* * *

Until about 10 years ago, the barren fields of the arid north, between the Andes and a point anywhere from 15 to 100 miles from the Pacific Ocean, supplied an annual income of about \$25,000,000. It was here that nitrate was taken out of the ground and shipped to the farmers of the world. While much of this money went to foreign operators, Chile was able to pay 68 percent of her costs of government with what remained and buy manufactured goods abroad. But when nitrate began to be made synthetically the handwriting on the wall could be seen plainly, for Chile was in the same position as many a tropical country that has but one export crop. Chile has had to face a brave struggle in these last 10 years to pull herself out of the condition in which 50 years of dependence on nitrate had placed her.

Copper is another important source of wealth. Together with other mineral products, it now forms more than 80 percent of Chile's exports in value. But the significant thing to keep in mind here is the fact that foreigners have been for the large part the beneficiaries of these exports, since they were the ones who owned the enterprises.

It is in the agricultural industries that future development of the country lies and it is here that notable changes are beginning to be made for the betterment of the people at large. With modern methods, Chile could produce food for at least 10 times as many people as are now supplied.

Fresh fruits—such as grapes, cherries, pears, plums, and melons—have already been shipped abroad. Chilean wines are also well known in many foreign countries. Chilean honey has gone to Britain and Germany, and malt has been furnished to breweries as far north as Cuba.

On the other hand, Chile, like several other South American countries, imports huge quantities of rice and other much-needed food products which, according to Chilean specialists,

could and should be grown at home. One of the most remarkable aspects of Chilean life in the last few years has been the effort of Chilean leaders to face in fearless fashion this huge task and the social problems so closely tied up with it. The *Corporación de Fomento de la Producción* has been set up by the Government to work out production plans on a national scale, not only in agriculture and kindred fields, but also in commerce and transportation, industrial development, mining, and public utilities.

The tendency within the last few years has been to bring all production in the Republic, whether operated by Chileans or foreigners, under forms of control calculated to assure to the Chilean people as a whole what is considered a fair share of the resulting benefits. It is also hoped to make the development of industrial life serve the needs of the people in Chile more directly than was possible in the past. For instance, one hears of the recent investment of \$100,000 for the development of a dairy industry.

* * *

That the new trends have not had easy sailing

can well be imagined. To come back to agriculture, farming in Chile has not been just a production problem, but a vast social dilemma as well. Chile has been a classic example of huge land concentrations in the hands of relatively few families. Only 5 years ago, one-half of one percent of the people held 53 percent of the worth-while land (about 59,000,000 acres). The dangers which such a situation presents for all social classes need hardly be dwelt upon at length. In terms of human beings, the figures were interesting, too. Out of the 452,000 living on this land, 108,000 were *inquilinos* or tenants, attached to large estates, who must serve the estate owner whenever called upon at the equivalent of 10 cents a day. They do not own the house in which they live but are permitted to raise some of their food on a little land patch. Much of the recent legislation has been directed toward increasing production of the things Chile needs by encouraging smaller holdings and improving the lot of those who live on and by the land.

In industry, too, considerable legislation has been passed to improve the condition of those



Copper mining town in Chile.



Commerce Building, Santiago.

Pan American Union Photos.

who work for wages. In fact, some of the most advanced labor laws have been adopted by Chile.

Cooperative programs have been encouraged. State bakeries have been planned. Education has been steadily improved; new schools are being built every year. Notable is the movement to give courses designed for thousands who will never become professionals. Thus, it is hoped to give Chile a class of people who can work skillfully with their hands. Their existence should augur well for the country's economic future.

Both the vast holdings of United States interests in Chile and the development of trade relations have served to promote a feeling of mutual economic interest between the two nations.

Recent world developments have brought to a focus the need for still greater economic cooperation than in the past. Both loans and increased purchases of Chilean goods by the United States have come in for much discussion. Chileans themselves, as far as can be ascertained, are much more in favor of expanding markets for Chilean goods in this country than for contracting new loans which only furnish temporary relief and must ultimately be repaid with interest.

On the cultural front, Chile and the United States have been establishing bonds of friendship which cannot help being translated into lasting value to both nations. For some time now, the University of Chile has been offering summer courses for teachers and students from the United States. Chile is one of the countries which ratified the Buenos Aires Convention of 1936, providing for the exchange of professors and students with other American nations. Under this convention, professors and students have already been exchanged between the United States and Chile.

The need for hemisphere defense has found an understanding desire on the part of Chile to cooperate for the common welfare of the Americas. Chileans are extremely patriotic, and the needs of the present war have not found them wanting in a fervent desire to help preserve the common American heritage. That this is not merely an official attitude was proved last year by the organization of the League of Defense, popularly known as "The Sixth Column." Over 3,000 Chileans, some of them prominent

in the life of the Republic, joined the movement. The closing words of its credo might well serve as a call and an inspiration to all the Americas: "We do not seek political influence but firmly support the . . . dignity of man before man. We aim to awaken our democracy from the fatal sleep of misplaced confidence and blindness to reality, which has already been responsible for the defeat of the democracies in Europe."

READING

About the Americas

(This department has been established because of numerous requests for suggested reading material on the Americas. Inclusion in or omission from the list should not be regarded as appraisal of a publication.)

Pan America, Carleton Beals; 540 pp., Houghton-Mifflin Co., Boston, 1940. Discusses raw materials and outlines program for inter-American action. Maps.

A Short History of the Americas, R. D. Cotterill; 455 pp., Prentice-Hall, New York, 1939. A text, covering discoveries, colonial period, revolts, immigration, expansion, World War and inter-American relations. Maps.

Handbook of Latin American Studies, Lewis Hanke and Marion Burgin, Eds.; 476 pp., Harvard University Press, Cambridge, 1940. Lists works produced in various fields of Latin American studies during past year.

Economic Relations with Latin America, D. M. Phelps, Ed.; 75 pp., University of Michigan, Ann Arbor, 1940. Published as No. 6 of "Michigan Business Papers." Proceedings of a conference held as part of the Institute of Latin American Studies, Ann Arbor, Mich., Aug. 11-12, 1939.

Economic Relations Between the Americas, Mordecai Ezekiel; 76 pp., Carnegie Endowment for International Peace, New York, 1941. A reprint from "International Conciliation," February 1941. Describes trade policies during the 1930's, effects of present war, program for inter-American economic cooperation and defense. Quotes at length from H. A. Wallace's speech of Oct. 11, 1940, on "Pan American Defense." Contains trade charts.

THE RISE OF ROTENONE

by R. C. ROARK*

A BOTANICAL Peck's Bad Boy, reared on the wrong side of the railroad tracks, who grew up to be president of the First National Bank—that is rotenone, one of the most potent insecticides in use today.

For 300 years, this "Rags to Riches" hero of the agricultural world languished in the world's jungles, known only to aborigines who used it to poison and capture fish. As recently as 1930, trade in the roots of rotenone-bearing plants was practically nonexistent, yet in 1940 the United States alone imported 6½ million pounds in crude and powdered form. It is one of the most astonishing developments in agricultural history.

In terms of Western Hemisphere solidarity, the skyrocketing of sales is just as encouraging as it is remarkable, for rotenone-bearing plants,

tives using the *haiari* plant in the same way. He reported that they beat the roots into shreds, soaked them in water and then poured the milk-white fluid overboard from a boat.

"In about 20 minutes," says Hillhouse, "every fish within its influence rises to the surface and is either taken by the hand or shot with arrows. A solid cubic foot of the root will poison an acre of water, even in the falls where the current is so strong. The fish are not deteriorated in quality nor do they taint more rapidly when thus killed than by being netted or otherwise taken."

Today, of course, the use of poison to catch fish has been made illegal in most countries on the theory that it is harmful to wildlife, but use of the plants in killing insects has made them more valuable than ever before.

Before going ahead, it may be well to break down rotenone's family tree a little. The actual poison consists of rotenone and substances related to it called rotenoids. It is a colorless, crystalline compound, which in powdered form appears white. It is one agricultural product that seems definitely safe from synthetic competition, since the chemical formula, while known, is so complex that there is little possibility that it will ever be duplicated in a test tube.

Rotenone is found as a solid in the dried roots of certain plants of the bean family which are native to most tropical sections of the globe. Some produce negligible amounts of rotenone and some produce as much as 12 percent.

What might at first seem a complex relationship is simplified by the fact that there are only two important rotenone-bearing branches of the family—the *Derris* of the Far East and the *Lonchocarpus* of Latin America. It is in the latter that we are interested and chiefly in only two of its members—the *cube* (pronounced COO-bay) of Peru and the *timbó* of Brazil which produce most of the Latin American rotenone of commerce today. The *haiari* and the *nekou* of the Guianas, mentioned previously, are minor sources. The Spanish-speaking people of Latin America generally call all fish-poisoning plants *barbasco*, whether they contain rotenone or not.

The discovery that some of the fish poisons are also potent insecticides was probably made centuries ago, but there was no reliable infor-

* As principal chemist with the Bureau of Entomology and Plant Quarantine of the Department of Agriculture, Dr. R. C. Roark is widely known for his investigations into the technical, economic, and practical aspects of insecticides. A native of Kentucky, he has had extensive experience in chemical research in private industry and has headed the Department's Division of Insecticide Investigations for the last 14 years.

which do not grow in the United States, abound in South America, and there is every possibility that they will play an important role in the steadily increasing trade between this country and Latin America.

In the world's belated discovery of commercial value in these unimpressive climbers and creepers of the jungle, primitive man has the laugh on modern civilization. Centuries before we learned that plant poisons could be used to kill insects that prey on human food, the natives of the American, Asiatic, and African tropics were using the same plants to stun fish and thus solve more directly the problem of keeping their stomachs full.

In 1665, the explorer De Rochefort saw the natives of the West Indies using a wood which they cut into pieces and threw into fish pools. The French botanist Aublet wrote in 1775 that the natives of French Guiana used a plant called *nicou* as a fish poison. The English traveler Hillhouse, in 1834, saw British Guiana na-



Photo by E. P. Killip.

Peruvian Indians using cube as a fish poison. The baskets contain cube root. Man in center is mixing root with water to form milky liquid that will be poured into river to stun fish. The practice is now illegal.

mation on the subject until comparatively recently. In 1848, the use of derris as an insecticide in British Malaya was officially reported, but the Chinese had used it there a long time before to kill insects attacking growing vegetables. In 1909, the botanist Bryant found African Zulus killing head lice with an extract made from the leaves of certain species of *Tephrosia*, a relative of *Derris* and *Lonchocarpus*. In 1910, *cube* was used as an insecticide to destroy ticks on llamas in Peru.

Following the early accounts in England of the use of derris as an insecticide in British Malaya, certain chemical manufacturers there began the preparation of liquid insecticides containing derris extracts. These products, which were sold under trade-marked names, appeared on the market in England in 1911 and shortly thereafter in the United States. For the most part they were recommended for use in controlling aphids and insects affecting animals, especially lice. Even for these pests the first insecticides made from the roots of derris failed to have extended use, largely because they were variable and their effectiveness was uncertain.

Not until 20 years later, after extensive chemical research, were manufacturers able to go ahead and make derris preparations with the assurance of producing standardized insecticides that would be effective.

The urgent need for an insecticide which would not leave objectionable residues on the marketed product encouraged entomologists to make extensive tests of derris, and its value for the control of certain plant-feeding insects was soon established. Its popularity grew rapidly and from 1932 to 1940 the importation of derris root into the United States increased from 38,000 pounds to 3,220,972 pounds, or 84 times!

Today, the potency of rotenone against many pests is firmly established. It is 15 times as toxic as nicotine when sprayed upon bean aphids and 25 times as toxic as potassium cyanide to goldfish. There is, however, a wide variation in its effect on different insects. Summer vacationers will be glad to hear that mosquito larvae succumb to 5 parts of rotenone in 1,000,000 parts of water. The southern armyworm, on the other hand, eats the substance with relish, or at least with no ill effects, and there are a number of

borers that take delight in turning the tables on the human race by attacking the dried derris and *cube* roots in storage, reducing the material to powder and greatly reducing its value.

It is an ideal insecticide in many respects because it is highly toxic to most cold-blooded animals and relatively non-poisonous to warm-blooded animals—30 times as poisonous as lead arsenate when fed to silkworms but only one-thirtieth as toxic as the same substance when fed to rabbits, for instance. That is good news, not only to rabbits, but also to human beings, for it means that cabbage, cauliflower, peas, beans, and other foodstuffs can be treated with rotenone without the slightest harmful effect on consumers.

While entomologists have tested rotenone insecticides upon almost 300 different kinds of insects and have found them effective against many species, their use is as yet recommended only against comparatively few. Further study probably will extend their use. Even now, however, rotenone dusts and sprays are in large-scale use for the control of many pests of outstanding importance, including the pea aphid, the pea weevil, the Mexican bean beetle, cabbage worms, fleas, flies, lice and ox warbles.

In the natural state, rotenone-bearing plants are large woody climbers which up to the age of 4 years have a bushy form and later may reach the tops of tall trees. When cultivated in plantations the roots are customarily harvested when the plants are 2 or 3 years old. Tropical conditions with not less than 80 inches of rain a year are necessary for their growth.

In the principal producing countries *Lonchocarpus* is cultivated on plantations of various sizes, often in the vicinity of dwellings. Killip and Smith, United States explorers who visited Peru shortly before rotenone became an article of commerce, say that the cultivated areas, or *barbascales*, varied greatly in size from small clearings of 25 to 100 plants intended to meet the fishing needs of a single Indian family to large plantations of as many as 10,000 trees, the source of supply for a whole neighborhood. At present, large quantities of roots of wild plants are collected in addition to those grown on plantations.

The natives used to start the plant merely by burying a piece of the stem about a foot long

2 or 3 inches below the surface of the soil, and the modern method of establishing a plantation is essentially the same, although the La Molina Experiment Station in Peru has developed scientific methods of selecting the stem-cutting and placing it in the ground that greatly improve the stand. In Peru, planting is usually done in September or October, and the plants reach a height of 3 feet the first year, 5 to 6 feet the second year, and perhaps 8 feet the third year.

One difficulty in cultivation is the heavy growth of weeds. This is reduced by interplanting with such crops as cassava, beans, and pineapple, a practice that also permits more economical use of the land. The root is harvested at the end of the second, third, or fourth year, usually in the dry season when the work is easier. Data on yields and rotenone content are unreliable, but they are sufficient to indicate that under proper conditions the crop is profitable for growers.

Cube, *timbó*, and derris are imported into the United States chiefly in the form of dried roots, from which the powdered commercial insecticides are produced. The crude roots are finely ground in special mills and then mixed with clay or talc to a rotenone content of 1 percent or less. Most of the dusts on the market contain only about three-fourths of 1 percent rotenone. If thoroughly applied, dusts containing as little as one-fourth of 1 percent are effective against the pea aphid, cabbage worms, and many other insects. Extracts from these roots dissolved in safrol, alkyl phenols, or other solvents are added to kerosene to make fly sprays. Pyrethrum extract is often added to *cube* extract, as the combination is especially effective.

The use of all rotenone-bearing plants as insecticides is bound to expand. Rotenone and the rotenoids associated with it are effective against a wide range of agricultural as well as household insects, except in extreme concentration they are harmless to man and domestic animals, they are cheap, they can be applied safely to the most tender vegetation and they leave no poisonous residue on fruits and vegetables.

In 1940, the United States imported 2,225,347 pounds of crude *cube* roots from Peru valued at \$185,840, or an average value of about 8 $\frac{1}{3}$ cents per pound. In addition, 387,413 pounds of

crude and 658,920 pounds of powdered *timbó* root were imported from Brazil and 74,163 pounds of crude *barbasco* root from Venezuela—a total of 3,345,843 pounds. This was slightly more than the 3,220,972 pounds of crude derris root imported from British Malaya and the Netherland Indies, the Philippine Islands and other countries.

In 1937 and again in 1938, derris root constituted only 24 percent of the total amount of rotenone-bearing roots imported into the United States. In 1939, 43 percent of these imports was derris root and in 1940 almost 50 percent was derris root. Thus, at least until recently, the South American roots were losing ground relative to the Far Eastern derris in the American market. The reason lies chiefly in the higher rotenone content that U. S. importers have come to expect from derris root, in comparison with *cube* and *timbó*. In the Netherlands East Indies and also in British Malaya, remarkable progress has been made in developing derris of high rotenone content. A decade ago most of the derris root of commerce contained only 1 or 2 percent of rotenone. Now material is available that

contains 10 or 12 percent. This was accomplished by careful selection of high rotenone content roots and propagation from this stock only.

This has not been done to nearly so great an extent in South America, but there is no reason why it cannot be. At the Federal Agricultural Experiment Station in Mayagüez, Puerto Rico, several hundred species and strains of *barbasco* have been collected and tested. Most of them are low in rotenone content, but some contain the poison in impressive amounts and should provide highly desirable strains for Western Hemisphere plantings.

Numerous tests have shown that rotenone is of equal potency, whether produced from the *barbasco* of South America or the derris of the Far East. The only variation is in the rotenone content of the roots. With the United States interested both in Western Hemisphere teamwork and in new sources for products which it becomes increasingly difficult to import from the East, the growing in tropical America of plants carefully selected for high rotenone content looks like a profitable undertaking.



Photo by E. P. Killip.

This is a growing cube plant.



Dried roots are shipped like this.

AGRICULTURAL FRONT

TO DIVERSIFY PERUVIAN FARMING

As a step toward diversification of its farming, the Peruvian Government has created a commercial department in the Bureau of Agriculture and Livestock. The bureau will also serve to keep farmers informed concerning changes in the demand for and prices of agricultural products of foreign and domestic origin. Efforts will be made to establish classes and standards for Peruvian farm products that will facilitate marketing.

HEADS GUATEMALA SCHOOL

Albert S. Muller, a New York native with unusual experience in the teaching of agriculture in Latin America, has been named recently as director of the Central National Agricultural School of Guatemala at Chimaltenango. Previously he has been on the faculties of the Agricultural College of Mayagüez, Puerto Rico; the Agricultural and Veterinary School of Minas Gerais at Vicosia, Brazil; and the School of Agriculture and Zoology at El Valle, Venezuela. Mr. Muller, a specialist in plant pathology, is a graduate of Cornell University at Ithaca, N. Y.

COTTON CONGRESS POSTPONED

The national emergency has forced postponement of the Pan American Cotton Congress, at which delegates from all the Western Hemisphere nations were to have discussed ways and means to increase popular consumption of cotton and cotton products in the Hemisphere.

This decision was made by the organizing committee and announced by George J. Eckert, general chairman in charge of planning the Congress, who said the committee will be maintained until conditions for the meeting are more favorable. Said Secretary of State Hull, concurring in the postponement decision: "I note with particular satisfaction that this decision was prompted by the desire of all concerned to cooperate fully with the Government during this period of national emergency."

The Congress was to have been held October 6-10 in Memphis, Tenn. Invitations were ex-

tended by President Roosevelt after the U. S. Congress authorized the meeting in a joint resolution of September 17, 1940.

TECHNICAL SURVEY IN BRAZIL

A study of technical methods used in processing agricultural products in the São Paulo area in Brazil has been undertaken by the U. S. Department of Agriculture. Findings are expected to benefit agricultural manufacturing processes in both countries.

The survey is being made by Dr. Francis H. Thurber of the Bureau of Agricultural Chemistry and Engineering, a specialist in agricultural chemistry and technical processes, particularly of starches. A graduate of the University of Chicago and a former member of the faculty of Oregon State College, Dr. Thurber has been engaged in chemical work for the United States Government since 1920.

From Brazil, Dr. Thurber will go to Peru, where he will join B. Y. Morrison and B. B. Robinson of the Bureau of Plant Industry in an exploratory agricultural survey, the seventh to be undertaken at the request of a Latin American government.

BUSINESS COMMITTEE FORMED

To protect buyers and sellers in the Americas from trading practices that may be inimical to Hemisphere solidarity, an Inter-American Business Relations Committee has been established by the Inter-American Commercial Arbitration Commission of New York City. Kenneth H. Campbell, director of the foreign department of the National Association of Credit Men, will head the new committee.

In describing the work of the organization, Mr. Campbell said: "Our facilities are free and voluntary. Since the outbreak of war, with its negative effect on European export trade, a great number of Western Hemisphere businessmen have entered the inter-American market. Being new to the ways of trading in this new field, some of them have run into trade difficulties and misunderstandings. If these disagree-

ments are allowed to go unsettled, they create ill-will and hamper governmental efforts at Hemisphere solidarity.

"Those commercial disagreements which can be arbitrated will be sent to the Inter-American Commercial Arbitration Commission, while others will be routed to those trade, business, or government organizations best equipped to effect a speedy adjustment with the utmost goodwill."

Headquarters of the Inter-American Business Relations Committee are in the offices of the American Arbitration Association at 1230 Sixth Avenue, New York City. Joseph M. Marrone, former special trade commissioner of the Department of Commerce, is secretary of the committee.

Plants—

(Continued from p. 6)

ship and bridge timbers, and wharves. Argentina and Paraguay still furnish the world's entire supply from wild trees.

The list of native American plants producing valuable oils and waxes is long and includes various palms, such as babassu and cohune, which yield an oil used in making margarine, soap, and candy.

The oil pressed from the seeds of the oiticica tree has excellent drying properties and is classed with linseed and tung in the making of paints and varnishes. From the carnaúba palm is derived a valuable raw material for the manufacture of automobile, floor, and furniture polishes, phonograph records, carbon paper, varnishes, candles, insulation materials for cables, and numerous other articles.

Of cabinet and building woods, America's forests have given the world great variety. Among the best known are balsa, one of the lightest of all known woods, and the highly prized commercial wood, mahogany.

The foregoing list is by no means exhaustive. Confining itself strictly to major American con-

tributions to the world, it omits many products—as varied as orchids and wild rice—which were native to both the Old World and the New, and countless minor crops, not commercially important today but regarded as having considerable possibility for development.

Today many of these American natives are grown more widely in Europe, Asia, and Africa than in America. The white potato is of outstanding importance in northern Europe, and maize is a major crop and a leading item of the diet in the southeastern European countries, including Italy. The sweet potato was distributed across the Pacific and is well-nigh universal in tropical and subtropical countries. British India, China, and Africa are the chief peanut-producing areas.

All of *those*, of course, the Western Hemisphere continues to produce in sufficient quantities for its own needs. The tragedy is that so many crops of American origin are now produced in the Western Hemisphere either not at all or in such small quantities that consuming countries depend on sources outside the hemisphere, where American natives have thrived in foster homes.

For instance, cassava has become the principal root crop in parts of tropical Africa and the East Indies and is a deficit product of the Western Hemisphere. The principal cacao producing regions are in west Africa, with Latin America furnishing only a third of the world supply. Most of the vanilla of recent years has come from the French African colonies. Sisal is grown chiefly in east Africa and the Philippines. Kapok comes principally from Malaya. The cultivated Hevea rubber tree is almost a curiosity in Latin America, the Far East supplying most of the world's needs.

An important phase of the agricultural program in the Western Hemisphere today is the reestablishment on their native soil of these and many other products which the Americas gave the world.

Aurelio F. Concheso—*Our Mutual Friend*

MORE than 40 years ago the United States and Cuba were allies in the latter's war of independence. Ever since, the association of the two republics has been an example to the world of international amity and good will.

Today, with war clouds hovering over the Caribbean and with Cuba in a strategic position, that long friendship has paid both nations dividends and has brought into the spotlight Cuba's Ambassador to Washington, law-trained, multilingual Dr. Aurelio F. Concheso.

Born at Sancti Spiritus, Cuba, Dr. Concheso was educated in La Salle College and the University of Havana, and later studied in Europe at the University of Rome. A brilliant scholastic record won him appointment, at the age of 23, as professor of penal law at the University of Havana. He also served as secretary to the University's faculty of law.

In addition to his native Spanish, Dr. Concheso speaks English, French, German, and Italian. He has represented Cuba at such international gatherings as the Eighteenth Assembly of the League of Nations, the Disarmament Commission at Geneva, the Crippled Children's Convention at Budapest, and the Eighth Pan American Scientific Conference in Washington.

His service to the national government began in 1933 with his appointment as Secretary of Justice. Since then he has been Secretary of Education, Secretary of the Council of Ministers, and Minister of the Presidency, and, in the diplomatic field, Minister to Peru and Minister to Germany before appointment to his present position in Washington in December 1940.

Dr. Concheso has been editor of the Cuban Review of Private Law and has done extensive writing on law and government, including the publication "To Liberty Through Culture," which outlines the educational system he inaugurated in Cuba as Secretary of Education. He has been decorated with the *Orden de Carlos Manuel de Céspedes*, the *Gran Cruz de la Cruz Roja* and the Order of Cádiz.



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Agriculture *Americas*

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October 1941

OFFICE OF FOREIGN AGRICULTURAL RELATIONS
UNITED STATES DEPARTMENT OF AGRICULTURE

Nearing a Major Goal . . .

AN Institute of Tropical Agriculture, long considered essential to proper development of agriculture in the Western Hemisphere, is today closer to realization than ever before. Within the last month, prospective sites for the Institute have been surveyed by a party of three U. S. agricultural scientists. They have visited five countries, accompanied in each case by local agricultural technicians, and have inspected sites from the standpoint of suitability for tropical agricultural research and education. Selection of a site is anticipated soon after their report is submitted, and actual inauguration of the Institute should follow shortly.

When the doors at last swing open and the first students and technicians are admitted to the halls of this combined school of agriculture and experiment station, one of the major goals of inter-American agricultural cooperation will have been attained.

The project was first announced publicly by Henry A. Wallace, who, as Secretary of Agriculture, proposed such an Institute to the Eighth American Scientific Congress in Washington in May 1940. The Congress enthusiastically endorsed the Institute in a formal resolution, and the President's Interdepartmental Committee on Cooperation with the American Republics later approved it.

Detailed planning was made the responsibility of the Inter-American Commission on Tropical Agriculture, appointed by the governing board of the Pan American Union. This Commission is headed by Dr. Héctor David Castro, Minister to the United States from El Salvador, and includes representatives of Bolivia, Brazil, Colombia, Costa Rica, Ecuador, Guatemala, Peru, Venezuela and the United States.

In the last year, little has been heard publicly of Institute plans, but a great deal of quiet work has gone on in frequent meetings of the Commission. Five offers of Institute sites have been received. Assurance of full cooperation has been obtained from one after another of the public and private agencies interested in inter-American relations. Methods of financing have been examined. Opinions have been solicited as to the exact form the Institute should take.

Of the Institute's objectives and its probable role in Pan American solidarity, no better statement has ever been made than that of Mr. Wallace in his address to the Scientific Congress announcing the project, when he said: "The Institute would serve as a symbol of amity and of the economic and cultural relations between the Americas. It would lead to a better balanced agricultural economy in the Western Hemisphere. It would be in a position to present comprehensive data on the vital agricultural problems of all the American Republics. It would develop a broad knowledge of pests and diseases common to the great tropical region. In bringing together students in agricultural sciences, it would promote a mutual understanding between these future leaders in agriculture. Through cooperative research it would work toward the solution of serious problems in crop and animal production. The Institute would provide not only technical training but also an opportunity to acquire a knowledge of the languages and the varied business methods, standards of ethics and viewpoints of the Western Hemisphere."



The COFFEE Hemisphere

From "All About Coffee" courtesy William H. Ukers

by J. BARNARD GIBBS

THE Americas, to their regret, have let numerous native farm products slip from their grasp, but they have made amends by adopting many foreign plants. One of these is coffee, an ancient Asiatic product, which today is almost as American as the hot dog or the rumba.

Americans—North, South, and Central—grow more coffee and drink more coffee than any other people in the world. During recent years, approximately 85 percent of the world's coffee supply has been grown in Latin America, and coffee consumption in the Western Hemisphere has represented over 60 percent of the world total, with the United States alone accounting for nearly 50 percent.

This concentration of production and consumption in the Hemisphere has made coffee the guinea pig for one of the most ambitious examples in history of economic cooperation among the Americas. That is the Inter-American Coffee Agreement, which divides the Latin American share of the United States coffee market among the producing nations. Its operation is

being watched closely as a guide to adjustment of other Hemisphere agricultural surpluses.

Authorities agree that coffee is native to either Abyssinia (Ethiopia) or Arabia, or perhaps both. The Arabs were the first to cultivate the plant and use the beans, possibly as early as the 6th century, but Arabs were shuttling to and from Abyssinia in those days, a fact which leads to some doubt as to the exact place of origin of the plant. Some say that the name coffee comes from "Kaffa," an Abyssinian province. Others say it comes from the Arabian word, "Gahwah," meaning "the drink"—not just any drink but literally "the" drink.

For many years after coffee was first cultivated in Arabia, the expansion in its use was slow. So early in man's history, it appears, monopoly had reared its ugly head. William H. Ukers, a contemporary authority on coffee, reports that the Arabians, who knew a good thing when they saw it, tried to prevent propagation of the crop abroad by limiting exports of the berries or dried beans to those which had been made sterile through boiling or parching.

They could not watch every avenue of escape, however. With thousands of pilgrims (the "tourists" of their day) trekking to and from Mecca each year, the precious seeds slipped away, and during the 15th and 16th centuries the production of coffee was started in a number of other tropical areas in the Old World. By the end of the 17th and the beginning of the 18th century, the diligent Dutch had entered the coffee business, and for many years the coffee markets of the world were supplied chiefly from Java and the other Dutch islands of the east, whence comes Java as an almost universal nickname for coffee.

Journey to the New World

Coffee did not come to Latin America until the first quarter of the 18th century. It was started in a number of places at about the same time, but most of the early plantings that succeeded came from plants that were started by the French early in the 1720's on the very island of Martinique that is much in the headlines today. This French introduction of coffee into the Western Hemisphere is one of the most fascinating chapters in agricultural history. Co-heroes of the incident are King Louis XIV of France, who managed to obtain a young and vigorous coffee plant from the burgomaster of Amsterdam, and one Gabriel Mathieu de Clieu, a naval officer who successfully transplanted to Martinique a plant that had been produced in Paris from the Dutch gift to his King.

The journey was made by merchant ship during 1723, and, according to De Clieu's own journal, a single coffee plant was transported. Storm, calm, and pursuit by pirates prolonged the voyage; the water supply had to be rationed; and for more than a month De Clieu shared his water ration with his precious coffee plant, which was kept on deck in a glass-covered box.

Both the young officer and his charge survived the ordeal; the plant was set out in De Clieu's personal garden in Martinique; 3 years later came the first harvest; and 50 years later there were more than 18,000,000 coffee trees on the island. Unlike many another hero, De Clieu was not altogether unsung. He was recognized in French circles as an important contributor to the country's growth, eventually retired on a handsome pension, and was per-

mitted by Providence to go on drinking coffee to the ripe age of 88.

If coffee was slow to reach the Western Hemisphere, it spread like wildfire upon arrival. Before the end of the 18th century it was being grown in every part of the American tropics. The Portuguese colonists in Brazil found vast tracts ideally suited to coffee cultivation, and that country soon became the world's leading producer.

During recent years about two-thirds of the world's coffee supply has been grown in Brazil. Colombia is next in importance, accounting for nearly one-eighth of the world total. The output of other Latin American countries, including El Salvador, Guatemala, Venezuela, Mexico, Haiti, Costa Rica, and a number of others which are of minor importance, accounts for an additional eighth or more. Leading producing areas outside the Western Hemisphere include the Netherlands Indies, the colonial areas of East and West Africa, India, Ceylon, Aden, and Saudi Arabia.

The coffee berry looks a good deal like the ordinary cherry, and the ripe berries are in fact sometimes referred to in the trade as "cherries." Beneath the skin of the fruit are a thin, fleshy layer and tough membranes covering two seeds which are commonly known as "coffee beans." In preparation for market, the outer coverings are removed either by drying and cracking or by washing. The beans are then dried, cleaned, and sorted before being bagged for shipment from the producing country. Roasting and grinding are done in the United States.

The coffee plant is a low tree or shrub that seldom exceeds 20 feet in height when full grown. Under favorable conditions, it grows and blooms and bears fruit throughout the year, different sections of a single branch having flowers and green and ripe fruit on it at the same time. In all countries, however, there is a season of heavy bloom which produces the major crop and in districts where rainfall is limited largely to certain seasons of the year, practically the entire production occurs during the rainy season. The coffee-growing districts in all of the producing countries are in tropical or semitropical areas that are free from frost and range in altitude from sea level to over 6,000 feet. In general, the higher altitudes, where the weather is cooler, produce the better coffee.



National Federation of Coffee Growers of Colombia.

Picking coffee in Colombia. Larger trees are to shade coffee shrubs.

Most of the world's coffee is of the *arabica* species. There are only two other important commercial species, *robusta* and *liberica*, but that is where the classification of coffee ceases being simple. There are numerous varieties within the different species, and the characteristics of each variety change a good deal when it is grown under different conditions.

The trade simplifies matters by dividing world production of coffee into two general classes—"Brazils," referring to coffee grown in Brazil and "milds," referring to all other coffee, which generally has a somewhat milder flavor than the harsh "Rio" coffee grown in the vicinity of Rio de Janeiro. It is a rather inaccurate classification. Colombian coffee is properly classed as mild, but there are some areas outside of Brazil that produce a coffee almost as harsh as "Rio." On the other hand, the soft "Santos" coffee of Brazil is much milder than "Rio."

Coffees are generally known by the names of the districts where they are produced or the ports through which they are exported. The average consumer probably never hears these

names, but to a coffee man, each of them means a coffee of characteristic strength and flavor. These distinct types of coffee are used in making up the many brands sold to consumers after being blended in accordance with formulas that are closely guarded trade secrets. Some brands contain a single type of coffee, but most of them are blends of two or more types. The trade names may or may not have much relationship to the types of coffee used in producing the commercial brands they identify.

Few crops lend themselves more readily to large-scale production, and throughout the world much coffee is grown on large plantations, many of them under corporate management. The world's largest coffee *fazenda* (plantation) in the State of São Paulo, Brazil, contains more than 4,500,000 trees. It and similar large establishments, from which the annual production runs into the tens of thousands of tons, have their own service railroads, highways, stores, warehouses, agricultural scientists, and hundreds of laborers. Nevertheless, a substantial part of the

production is on small plantations which compare with the family-size farm of the United States.

Coffee is the principal cash crop of no less than seven Latin American countries and its control is largely concentrated in the hands of relatively few well-financed and influential corporations and individuals. Thus, it is natural that the present close relationship between coffee producers and governments of the countries should have grown up. For a great many years, this help took the form of developing suitable varieties, improving cultural practices and financing planters. In recent years, more and more of the efforts have been in the direction of supporting prices. Of the many measures toward this end, the burning of billions of pounds of Brazilian coffee is perhaps best known, but it was preceded by many less spectacular efforts.

Until 1900, the coffee business enjoyed relatively smooth sailing. Ever since, it has had recurrent financial troubles, usually as a result of surplus production. During the 1890's, coffee prices were high, low-priced land was abundant, and there was a heavy influx of cheap European labor into Latin America, particularly Brazil. The result was a big increase in coffee plantings. At the turn of the century, the coffee industry realized that it was producing more than the world was consuming, and the end of the production increase was not in sight. Prices dropped sharply and by 1902 efforts to control the situation began.

The first attempt was made in the State of São Paulo, Brazil, which at that time was producing approximately 70 percent of the coffee grown in that country. Plantings during the 5 ensuing years were limited by government decree. It was a noble experiment but it failed, chiefly because of new plantings made prior to the period of restriction and of continued planting in areas outside São Paulo, culminating in the record coffee crop of 1906.

In this crisis, the São Paulo government again took the lead, calling a conference with representatives of other important coffee-producing states of Brazil. From this meeting, held in the city of Taubate, came the Taubate Convention, an alliance of Brazilian coffee interests in a plan called "valorization." It was the coffee industry's first unified effort to put its house in order.

This valorization plan, like those of later years, consisted of advancing a fixed amount to producers on coffee held off the market, and also included maintenance of a propaganda bureau to encourage increased consumption of coffee abroad. The scheme, largely financed by private capital, proved fairly successful. From 1906 to 1912, stocks of coffee held under the plan ranged between a half-billion and one-and-a-half billion pounds. After 1906-07, prices rose and small crops in some of the years that followed allowed the stored surpluses to be sold at satisfactory prices. By 1912, the situation had improved so greatly that the valorization plan was dropped. There was only a short interlude, however, before World War I closed much of the European market and renewed the surplus problem. Brazil brought valorization out of storage and again it worked. Prices were maintained, and at the close of the war coffee held off the market was sold at a profit to the government.

Seeds of Trouble Ahead

In the success of valorization, however, lay the seeds of current marketing difficulties. Low prices returned with the post-war depression and in 1921 the Brazilian government resumed coffee buying. Ever since then the government has held large stocks. By 1930, it became evident that much of the surplus could never be sold at reasonable prices, and the government began to destroy its holdings. Since 1931, it has had burned or otherwise destroyed over 8 billion pounds of coffee, or enough to supply the United States market for more than 4 years. Throughout São Paulo and adjoining states are established coffee destruction dumps that smoke continuously as marketable coffee is reduced to ashes. Official statistics on coffee destruction are maintained and appear as a regular feature of many newspaper market pages. It is one of the strangest paradoxes of an out-of-joint world's struggle to live with abundance.

From time to time in the last decade there has been talk of a rounded program for inter-American cooperation in coffee production and marketing, but all specific projects have collapsed. Brazil produces so much of the world's coffee that its program has supported coffee prices generally. Competing countries were content to

eling to Brazil's coattails, taking no action of their own and continuing to expand their output. Similarly, producers in Brazil were willing to leave the problem in the hands of the government and, in spite of taxes on new plantings, were continuing to produce more coffee. Some increase in production was needed to supply the increase in world consumption, but output went far beyond this and surpluses kept growing.

The outbreak of the European war in the fall of 1939 brought matters to a head. It clamped down the lid on markets which formerly took between 35 and 45 percent of all coffee exports. By the summer of 1940, coffee prices were nearing all-time lows; planters were facing bankruptcy; and the Latin American producing countries, losing trade in other commodities also, were losing foreign exchange which they needed to maintain the value of their currency and to continue essential imports.

Realizing the importance of avoiding economic collapse in Latin America in a time of world crisis, the United States cooperated in negotiations which led to the Inter-American Coffee Agreement, signed in Washington in November 1940. This provides a satisfactory outlet in the United States for more than 55 percent of Latin America's coffee and facilitates the working out of plans to store surpluses that cannot be marketed because of the war.

The agreement does not guarantee the sale or purchase of a single pound of coffee and makes no reference to production or prices. It does establish the maximum amount that the United States may purchase annually from each producing country. The agreement sets up three basic quotas: (1) a quota for Latin American exports to the United States, which is based on past sales and is fairly prorated among the various countries; (2) a much smaller quota for United States imports from sources other than Latin America; and (3) a quota of Latin American coffee for shipment to points other than the United States, this amount also prorated among producing countries. The third quota is largely for post-war purposes, since it is obvious that little coffee is going from Latin America to Europe at present.

The agreement is administered by an Inter-American Coffee Board, composed of delegates from the governments of the participating countries—Brazil, Colombia, Costa Rica, Cuba, Dominican Republic, Ecuador, El Salvador, Guatemala, Haiti, Honduras, Mexico, Nicaragua, Peru, Venezuela, and the United States. The board's duties go beyond quota regulations to investigations of such problems as the disposal and storage of surpluses.

The agreement did not actually go into effect until April 1941, but it was made retroactive to October 1, 1940. Thus, considerable experience has been gained in operation. Beneficial results have been obtained, and coffee interests both in the United States and Latin America have been generally satisfied with the outcome, although several operating problems have arisen. Some corrective measures have been adopted, and others are in prospect.

Shipping Difficulties, Plus

At about the time the agreement became effective, shipping difficulties were beginning to develop as a result of the war, which brought about competition of importers in obtaining supplies. This, plus price-fixing measures adopted by some Latin American countries, resulted in exceedingly rapid price increases. The agreement has no provision for direct price control so, in order to check the advance and assure consumers of fair coffee prices, shipments to the United States in excess of original quotas were permitted.

The first move in June 1941, was to increase the United States basic quotas by 5 percent and to provide for advance shipment of 15 percent of the next year's quotas for storage in bond in the United States. It is believed that this corrected the impetus to prices caused by the shipping shortage, but it did not stop certain producing countries from raising their fixed minimum prices above the market level. Since this price fixing threatened to interfere with orderly marketing, the basic quotas were increased in August by an additional 20 percent. This placed the quotas materially in excess of normal consumption requirements, and at that level sharp price declines might follow an improvement in the shipping situation. This would be as objec-

(Continued on page 16)

PERU IS ON THE JOB



by MANUEL SÁNCHEZ DEL AGUILA*

WE call them *seringueros*—those forest workmen who extract latex from rubber trees. It has been more than 20 years since the last Peruvian *seringero* cut his last tree. But soon they will have work again, for Peru is on the job in the Western Hemisphere rubber-production program.

Those were romantic years in Peru—those years of the *oro negro* (black gold), as we used to call crude rubber in the boom days of the early part of this century, when South America produced most of the world's rubber supply. In that time, there grew up villages along the banks of the Amazon in which every day was

market day. The streets were filled with balls of rubber or with fine mahogany boxes containing hundreds of kilos of black gold, awaiting steamers to carry them abroad. Today, those villages are abandoned ghost towns, whose population has drifted to more promising districts.

The last of the big years was 1917, when rubber production in the Amazon Valley within Peru's borders amounted to 2,562,000 kilograms, or more than 5,500,000 pounds. The next year production was reduced by half. From 1919 to the present, it has been practically nothing.

The sharpness of this collapse was the result principally of the establishment of rubber production in lands far distant from South America. Through the late years of the nineteenth century and the early part of the twentieth, the British, Dutch, and French worked to establish plantation rubber production in their possessions in the Far East. By 1910, the British alone had 179,000 people working on their new rubber plantations in the Malay States, and by 1919, the trees they planted were in production. That

*Ing. Manuel Sánchez del Aguila, an experienced Peruvian agronomist, is chief of the *Estación Impulsora del Cultivo y Explotación del Jefe* of Peru—a national government agency established early this year to cooperate in the Western Hemisphere rubber project. His article, written in English at Lima, presents a Latin American viewpoint on the program.

(Continued on page 8)

THREE STAGES of the Peruvian program to reestablish the rubber industry are shown on these pages. At the right is an aerial view of the Tingo María Valley, where a rubber tree nursery was established this year. The Tingo María, one of a network of lowland valleys east of the Andes, is undeveloped and until recent years has been little known, but now it is connected with the Pacific Coast by highway. Covered with forests and dense tropical vegetation, it is ideal for rubber production.

The picture on the facing page shows *Hevea* rubber trees already growing at Oromina, where the other Peruvian rubber experiment station has been established. This station is on the Huallaga River in north central Peru. The seedlings shown grew from native Peruvian rubber seeds. Later, buds of high-yielding, disease-resistant rubber strains will be grafted to the stocks, and the "budded stumps" will be available for plantations.

Below is shown a field of unselected *Hevea* trees at the Oromina station. The trees are the remnant of an old grove planted in an



early unsuccessful attempt to grow plantation rubber in Peru. Today, they have no commercial value, but will be used to teach modern scientific tapping methods to Peruvian extractors of latex.



meant the end of the rubber boom in Latin America, where all rubber had come from wild trees.

Strictly speaking, we should not blame Europeans for the disappearance of our thriving industry. They did what was convenient to their economy, and we did little to protect ourselves. A few attempts to establish plantations were made in Peru, but unselected trees were used, disease soon ruined them, and for the most part they were engulfed by the jungle. So, while others were diligently planting rubber and improving it through plantation methods, we turned our eyes to other resources of our flourishing forests. But never have we found a crop to take the place of rubber. No other was so abundant in our jungles; no other brought us such prosperity.

Now the prospect for reviving what once was a leading Peruvian industry has come from the needs of the United States—the world's greatest rubber market. This United States demand offers a vast market for rubber, and it has at last been realized that the huge territories within the American tropics provide ample room for production.

The immediate impetus to our program came in late 1940 and early 1941, when United States scientists, surveying the possibilities of rubber production in several of the Latin American Republics, gave careful attention to Peru, whose former record was well known. The United States party was in Peru from August to November 1940. Two Peruvian scientists assisted in the survey. Almost immediately afterward the production job began in this country in a very energetic manner. The government voted an appropriation to carry out the work in a permanent way. Soon there emerged two nursery stations, one at Oromina in the Upper Amazon basin and the other at Tingo María, in the eastern foothills of the Andes—2,300 feet above sea level and connected by a good motor road with the Pacific Coast, 600 kilometers (400 miles) away. So successfully has the work of these stations progressed that by the end of this year Peru will be able to graft native rubber seedlings with improved strains originating in the Far East and imported from increase gardens that have been established elsewhere in tropical America under the same inter-American rubber project.

This rubber, growing from native Peruvian

seedlings, will be like a man who, feeling nostalgic, returns to the home from which he ran away many years before. Meanwhile, living in more advanced countries, he has become wise and successful. Thus he returns wealthy, happy, healthy, and a joy to his family. The same thing has happened to the seed of the wild rubber tree. It ran away from home and, after many decades of improvement, it is returning home, healthier and more vigorous than when it left and with a future full of promise.

The survey has convinced Peruvian officials not only that plantation cultivation of rubber trees is feasible but also that the wild native trees from which pre-1919 tapping was done are now fully restored after the barbaric exploitation of years gone by. Big specimens are standing idle in the forest and these hold some prospect for production in the near future.

Our chief reliance, however, will not be in these wild trees but in cultivated plantations, and that means that the new Peruvian rubber industry will differ radically from the old. For one thing, Peru will abandon the "rubber-ball" method of preparing its rubber for sale and shipment. In the old days, rubber was collected in huge black balls and shipped in the same form. Nothing was known in Peru of the smoked sheets of modern commerce in rubber. It is hard to control the quality of these balls because they tend to accumulate foreign matter that is rolled up between the layers. Furthermore, the balls contain a great deal of moisture, and this was always a deceiving factor to the *seringuero*, who was paid on a piece-work basis and thought that too high an allowance was made for moisture in discounting his payment for the work. It is believed that enforced regulations will lead in a short time to production of Peruvian crude rubber exclusively in the form of smoked sheets.

What is even more important, the change from wild to cultivated trees will have to be accompanied by a change in tapping methods if South America is to practice the kind of rubber culture necessary for successful production on a commercial scale. In the old days, in Peru and Brazil, a *machadito* (small hatchet) was used in tapping. Repeated blows were struck into the bark and wood of the tree, and the latex was drawn from several openings into small cups.

These deep and numerous cuts used up tapping surfaces quickly, prevented bark renewal and even killed a great many trees. Under the new program, the *machadiño* will be replaced by modern tapping knives, a single surface will be tapped, and one tin cup per tree will do the job of the half-dozen or so small cups the *seringueros* used in former times. To some, these may seem like small matters, easily corrected, but the hold of custom and tradition is strong, and making these essential changes looms as one of the chief trials of our first years.

It can be plainly seen from these examples that Peru is successfully on its way toward rubber production and is already grappling with the practical growing problems involved. We are, you might say, beginning to get out of the woods so far as production is concerned. There is, however, a question of economies that ought to be raised.

Those of us engaged in this preliminary work can go only so far. Actual growing of rubber is going to have to be done by Peruvian planters

and landowners who see it as a profitable source of income. These prospective growers often ask themselves: Will we be safe in regard to prices on plantation rubber by the time our trees become productive? They know that, while transportation distance, time and safety favor South America over the Malay States, we cannot compete in labor costs with the low wage areas of Asia. They know, too, that the war and its accompanying emergency needs will not last forever.

So it seems that, in addition to the cooperative planting system, there must be further development of an understanding between producers and buyers, if the future of rubber production in the Western Hemisphere is to be safeguarded adequately. That appears to be the logical next step in the program that is now so well launched.

Meanwhile, our energies are devoted to development of modern methods that will result in higher yields and lower costs for rubber production in this Hemisphere.

Haitian Corporation Formed

SPEEDY progress of the program in which the Haitian and United States governments will cooperate in the long term agricultural development of the Republic of Haiti (AGRICULTURE IN THE AMERICAS, July, 1941) is reported from Port-au-Prince. The Corporation through which the program will function has been formally organized and actually began business as of August 16. Practically all administrative and technical personnel is on the job, and plans for establishment of central plantations are well along.

Officers of the Corporation—the Société Haitiano-Américaine de Développement Agricole—are Thomas A. Fennell, agricultural advisor to the Haitian government, president and general manager; Maurice Dartigue, Minister of Agriculture of Haiti, vice president; and C. Reed Hill of Washington, D. C., secretary-treasurer and assistant general manager. Mr. Fennell and Mr. Dartigue are directors, along with Abel Lacroix, Haitian Minister of Finance; Andre Liautaud, Haitian Director of Rural Education; W. H.

Williams, director of the Bank of Haiti; and Horace W. Darton of the United States Export-Import Bank. Mr. Hill has been with the Office of Foreign Agricultural Relations in the Department of Agriculture. The bylaws require that three of the directors be citizens of Haiti and three be citizens of the United States. Dartigue, Lacroix and Liautaud are citizens of Haiti.

The Corporation, capitalized at \$1,000,000 is authorized to: (1) grow and develop rubber, oil crops, spices, drug plants, food plants, fiber plants, forest plants, and other Haitian natural resources; (2) carry on experimental work in disease control and plant development; (3) develop methods of processing agricultural crops and promote manufacturing and handicrafts related to agriculture; and (4) buy and sell agricultural and manufactured products in both foreign and domestic markets.

The program is expected to bring about a substantial increase in Haitian production of tropical export crops which complement the agricultural production of the United States, thus stimulating trade between the two countries.

OUR NEIGHBOR NICARAGUA



Hauling water in Nicaragua.

by JOHN ASHTON*

A TRIANGLE the size of New York State—with its base on the shore of a tropical sea and its apex in the crater of a volcano—that is Nicaragua, largest of the six Central American Republics.

The warm humid east coast is washed by the Caribbean Sea. From north and south, the boundaries converge across the neck of Central America to meet on the Pacific side at the volcano of Cosiguina on the Bay of Fonseca.

Within this geographical triangle are vast reaches of both mountainous and level terrain, one of the world's largest fresh water lakes, acres and acres of undeveloped agricultural resources, and nearly a million people of varied inheritances, who practice a leisurely way of living in their predominantly rural land.

The first white man to see Nicaragua was Christopher Columbus, who touched there on his fourth and last voyage. On the twelfth of September, 1502, Columbus and his men anchored behind a cape at the mouth of the Coco

River for shelter from a storm. To this cape Columbus and his men gave the name, Cabo Gracias á Dios (Cape Thanks Be to God), and that is the name today of the cape, of a department that occupies a large part of northeastern Nicaragua, and of a little city on the Caribbean just where Nicaragua touches Honduras.

Next Spanish arrival was Gil González de Avila, who 20 years later reached the Rivas district by way of the Pacific and Costa Rica. He was followed, after his departure with considerable gold, by Francisco Hernández de Córdoba, who founded the cities of Granada and León in 1524.

The Spaniards found four principal tribes of Indians inhabiting the country, one of which was the Niquiranos. Their chief was Nicarao, a powerful, friendly Indian for whom the country was named. Not all the Indians welcomed the visitors with open arms, as did Nicarao, but those who were hostile were quickly subdued and Spanish influence over the country was soon established. Nicaragua became free of Spain in 1821, along with the rest of Central America,

and was a part of the short-lived Federation of Central America until it declared its independence in 1838.

Traveling in Nicaragua, you are never very far from the mountains. For miles along the west coast rise great volcanic craters, some dead, some slumbering, and some very much alive. By far the most striking is the giant cone, Momotombo, which emits smoke and vapor continually and is visible at a great distance. Almost 6,000 feet high and standing apart from other peaks, it is the most prominent landmark in the country, and from the northwest side you can see its large crater and the deep gash in its side down which poured the molten rock of its last great eruption in 1905.

* Dr. John Ashton is on leave from the faculty of Texas Agricultural and Mechanical College, serving as an exchange professor and agricultural adviser to Nicaragua under the Convention for Promotion of Inter-American Cultural Relations, to which most of the American Re-

Nicaragua has the conglomerate population so characteristic of the tropical Americas. The bulk of its laboring population is composed of Indians, who for the most part are placid and industrious folk. The next largest group is of mixed blood, with those of pure European blood in the minority. The later are, of course, descendants of the original Spanish colonists, most of whom came from Andalusia in southern Spain.

On the east coast live about 20,000 Miskito Indians (corrupted to Mosquito), who have mingled to some extent with the Negro population of that region. Most of these Negroes are descended from Jamaica slaves, which accounts for the rather startling fact that in this Spanish-

publics are parties. A native of England and a resident of the United States since 1901, Dr. Ashton has been on the staffs of several agricultural publications, has written a number of books on livestock production, and has traveled widely in Europe and Latin America.

Consignina, 3,000 feet high, has been inactive since a tremendous eruption in 1835. Other peaks in this western range are Madera, 4,590 feet; Ometempo, 5,747 feet; and El Viejo, 5,840 feet. All these altitudes are calculated from the surrounding country and not from sea level. There are many other totally extinct volcanoes, the craters of which are deep lakes of fresh water.

An eastern mountain range enters Nicaragua from Honduras and extends most of the distance along the east coast, sending out numerous spurs toward the Caribbean. Between these flow the many streams and rivers that abundantly irrigate the country on their way to the coast. Between the two ranges lies Nicaragua's great interior basin, almost 300 miles long by 100 miles wide.

Almost a tenth of Nicaragua's area is water, most of it accounted for by Lake Nicaragua, 92 miles long by 34 miles wide and one of the largest bodies of fresh water in the world. On its northwestern shore is Granada, Nicaragua's oldest city and long a contender for the site of the national capital. Its outlet to the Caribbean is the San Juan River, and it is this route that has been proposed for a second canal across Central America. Lake Managua, on which is situated the capital, Managua, is smaller but still a substantial body of water.

speaking land one finds many Indian-Negro "Zambos" who speak English but know little or no Spanish.

Knowledge of English is, however, by no means rare in the country, and the opportunity to learn it is eagerly sought. The Nicaraguan President, General Anastasio Somoza, and his charming wife were both educated in the United States and speak English fluently.

The country is fortunate in its climate and in the fertility of its soil. Lying between two great oceans, it enjoys an insular regularity of temperature, and extreme heat is rare except in the lowlands near the coasts. There are only two seasons, a wet season called winter which begins about the middle of May and continues until the middle of November, and the dry season called summer which fills the other six months of the year.

Nicaragua lives by agriculture, importing most of its manufactured goods and paying for them with the proceeds of native farm products and a few minerals, with which it is usually able to maintain a slight favorable balance of trade. In 1939, exports exceeded imports by almost 2,000,000 *córdobas*, or roughly \$400,000.

First in value among Nicaraguan exports is gold, produced largely in mines controlled by United States or Canadian capital. Agricultur-



Dr. John Ashton (left) with Gen. José Zelaya, Minister of Agriculture.

ally, coffee is by far the leading money crop, and at present virtually the entire crop is being shipped to the United States. The country stands twelfth in the world in coffee production, and enjoys a well-merited reputation for the quality of its "washed" coffees.

Corn grows abundantly all over the country—abundantly, that is, when rain falls at the proper time. The drier regions produce a crop of corn as grain plus a second crop of forage corn (known as *huate*) during the same season. Other districts produce two crops of grain a year and to the east of the great mountain range, where it rains throughout the year, it is possible to grow three crops a year.

Under the circumstances, it is not remarkable that Nicaragua numbers corn among its export crops. However, the country is so lacking in internal transportation facilities that while the Pacific coast is shipping some 20,000 *quintales* of corn to other Central American countries each year, the Atlantic coast is importing half that amount. But more of Nicaragua's transportation later.

Nicaragua, of course, is a good source of most of the crops that thrive on heat and hu-



Cashew nuts—Nicaraguans eat the fruit and throw the nut away.

midity. The country contains millions of banana plants—both of the variety eaten raw and of the larger plaintain, which must be cooked and is an important item of the native diet. Nicaraguan cacao is of excellent quality and is used with parched corn in producing the national beverage and food, known as *tiste*. The country produces a good deal of sugarcane and contains the largest Central American sugar mill at San Antonio. Tobacco land is scarce and not enough for domestic needs is produced. Cotton is grown chiefly from seed of American Upland varieties, but expansion of acreage is hampered by serious insect infestations. From 1,000,000 to 2,000,000 coconuts are exported from the east coast annually, about one-half going to the United States.

The best tropical fruits abound in all sections—pineapple, mamey, zapote, níspero, mango, marañón, caimito, cherimoya, papaya, guayaba and others, all of them serving as human food.

The country is extremely rich in forest growth and contains a variety of woods, now little known in the United States, that could well

be of considerable commercial importance. Some are fine woods suitable for cabinet making, others are dyewoods and still others are useful for construction purposes. King of all these is mahogany, which is an export product of some importance.

There is abundant land, too, for many of the other tropical products which complement the agricultural production of the United States—sesame, castor beans, ipecac, Balsam of Peru, rubber and numerous fiber plants, for instance—some of which are now produced in commercial quantities and all of which could stand encouragement.

Hogs do well in Nicaragua and some lard is exported. Several herds of purebred hogs have recently been imported from Texas in an effort to improve the breed. Poultry improvement seems to hold some possibilities, and recently the Ministry of Agriculture has distributed to farmers 2,300 baby chicks of the White Leghorn, Plymouth Rock and Rhode Island Red breeds, which were shipped by air express from the United States and arrived in first class condition.

It is cattle, however, that constitute the basis of Nicaragua's livestock industry and hold the brightest prospects for the future agricultural and economic improvement of the country. Both increased inter-American trade and a higher domestic standard of living can be developed through stimulation of this industry. Blessed with expansive acreages of grass that possesses definite fattening and growing qualities, Nicaragua is estimated to contain half again as many adult cattle as it does human beings. The latest estimate is 1,500,000 head. The chief export outlet is Peru, which last year took about 1,600 head of steers and ordered another shipload this year. Costa Rica in the past has taken many Nicaraguan cattle, while El Salvador and Honduras have also been customers.

The native cattle of Nicaragua have much to recommend them. Considering the fact that feeding, as we know it, is virtually unknown in this country, it is surprising to see many well-conditioned cattle the year around. They lose a little weight during the dry weather, but recover it quickly during the rainy season.

Foremost drawback to quality beef production is the failure to make any sharp distinc-

tion between beef and dairy types of cattle. It is the custom of the country to rear bull calves in the dairy herds and breed them to cows of the same type. There is no veal production in Nicaragua, since the law forbids the slaughtering of calves. Furthermore, butchering methods are so crude that production of true quality beef is next to impossible.

The national Ministry of Agriculture recently has stepped into the program for improvement of the native breed of cattle by purchasing in the United States registered young cattle of dairy and beef type, which arrived in the early part of 1941. They constitute, it is believed, the first consignments of purebred cattle ever to enter this country directly from the United States. These imported cattle will serve as foundation herds, to be kept pure, at the new National School of Agriculture, to be established near Managua. The surplus will be distributed at approximately cost among farmers and cattlemen.

Maximum benefits of this beef cattle program or any other project for agricultural development are not going to be felt much so long as means of internal travel and transportation in Nicaragua remain in their present primitive state. With the exception of a railroad that connects the principal Pacific port, Corinto, with such important cities as Managua, León, Granada, and Chinandega, communications are bad, particularly east and west. Some of the so-called roads in the interior can only be used by pack animals or at best by ox-wagons in the dry seasons.

Real progress to correct this situation is now being made. Modern machinery from the United States is being used to construct the Nicaraguan section of the Pan American highway, under the supervision of U. S. engineers. In other places, dirt roads are being graded and made passable for automobiles. Ox carts, which do most of the heavy transportation work in the interior, will be kept off the motor highways to facilitate transport by truck. Nicaragua is, of course, fortunate in its two large lakes, which serve for transportation of agricultural products.

Lack of transportation is not the only barrier to agricultural expansion in Nicaragua. Methods of production are extremely primitive,

small farmers still employing almost the same methods they used many decades ago. They clear brush with the *machete*, stir up the soil with wooden plows drawn by oxen, and take their products to market on pack animals or by ox-wagon. This system is, however, undergoing a gradual change. Today, implements and machinery from the United States are on the scene, and the use of modern means of production increases steadily, if slowly.

Although Nicaragua is large, as Central American countries go, it suffers from some congestion of population, since perhaps seven-eighths of the inhabitants live on the Pacific side of the country, between the large lakes and the coast. It suffers, too, from concentration of most of its wealth in the hands of perhaps 5 percent of the population. The life of the rest of the people appears to have changed little since the period of the conquest, and their standard of living is relatively low.

The national government does have some facilities that are being made available to farmers in an effort to improve the situation. The *Banco Nacional*, which has branches in all the important towns and cities, makes 6-year mortgage loans and 1-year crop lien loans to farmers. These are of chief benefit to coffee planters, but small farmers may obtain loans without mortgage clauses and on terms that are made as easy as possible to meet. The *Banco Hipotecario* (mortgage bank) makes loans for as long as 25 years to those establishing farms, plantations and stock ranches. Methods of loan repayment vary somewhat in accordance with individual needs and wishes. Intensified and improved agricultural production is encouraged through loans made by the National Banks. Improved harvesting and processing of the important coffee crop have been promoted by national laws.

My observation has been that Nicaragua is a land of agricultural possibilities. Undeveloped in many respects, it is strongly disposed toward agricultural cooperation with the rest of the Americas. Already its government has taken many progressive steps. The chief additional needs are for encouragement, a bit of financial help and considerable technical advice and guidance.

READING

About the Americas

(This department has been established because of numerous requests for suggested reading material on the Americas. Inclusion in or omission from the list should not be regarded as appraisal of a publication.)

The Pan American Highway, Harry A. Franck and Herbert C. Lanks; 249 pp., D. Appleton-Century Co., New York, 1940. Follows path of Inter-American Highway from Mexico to Panama. Excellent photographs.

Latin American Trade, Frank Henius; 143 pp., Harper Brothers, New York, 1941. Deals with trade and exchange problems, credits, prices, investments, shipping, and related topics.

Latin America, Samuel Guy Inman and others; 34 pp., F. C. Compton and Co., Chicago, 1941. Reprint of three articles from 1941 edition of Compton's Pictured Encyclopedia.

Commerce of South America, Clarence F. Jones; 584 pp., Ginn and Co., Boston, 1928. An old book but still a reliable reference work on South American commerce.

Challenge to the Americas, J. I. B. McCulloch, 61 pp., Foreign Policy Association, New York, 1940. Short treatise on inter-American relations. Written around the Havana Conference of Foreign Ministers of 1940.

Sarmiento, A Chronicle of Inter-American Friendship, Madeline W. Nichols; 81 pp., Madeline W. Nichols, Washington, D. C., 1940. Scholarly treatment of a great Argentine educator and statesman who visited the United States in the middle of the last century.

Latin America and the United States, Graham H. Stuart; 513 pp., D. Appleton-Century Co., New York, 1938, 3d ed. A thoroughly revised edition of an old stand-by. Deals with the new Pan Americanism, the Monroe Doctrine and United States relations with Panama, Colombia, Mexico, Cuba, the Caribbean and the A. B. C. countries. Maps.

The People and Politics of Latin America, Mary Wilhelmine Williams; 889 pp., Ginn and Co., Boston, 1938. An old favorite college text brought up to 1938. Bibliography, maps and pictures.

ALONG THE AGRICULTURAL FRONT

DIRECTORY OF AGRICULTURAL SCHOOLS

A directory of schools of agriculture in Latin America, the first publication of its kind, has just been completed by the United States Office of Education. Prepared by James F. Abel of the Division of Comparative Education, it is a 26-page mimeographed pamphlet. A limited supply for free distribution is available from the Office of Foreign Agricultural Relations, U. S. Department of Agriculture, Washington, D. C.

The publication, compiled from information obtained by the State Department, lists by countries 182 institutions, of which 19 are faculties in universities, 90 are secondary schools and 37 are elementary. In addition there are 10 normal schools of agriculture and 26 others which give instruction on higher educational levels. Thirty-eight institutions not counted among the 182 are designated as experiment stations.

Says the Office of Education: "Agricultural education in these countries is mainly administered by public authorities and maintained by public funds, either national or local. A few commercial organizations are furthering agricultural education in their special fields. Some schools are maintained by religious bodies for humanitarian purposes.

"The schools naturally reflect the kinds of agriculture characteristic of the areas they serve: Fruits, grain, wine, tobacco, and animal husbandry in Argentina; agronomy, animal husbandry, and coffee-raising in Brazil; tropical crops in Colombia; coffee in El Salvador; and general agriculture in Mexico and most of the other countries."

PAN AMERICANISM AT L. S. U.

A Division of Latin American Relations has been established by Louisiana State University at University, La. It is headed by Dr. R. W. Bradbury, with an advisory committee of faculty members. The University has also established five scholarships to be awarded to Latin American students for the 1941-42 session, each worth \$270 a year, plus fee exemption.

PAN AMERICAN ROSE

The Pan American Rose Conference, which opened in Washington in September, was the first general conference on rose culture ever held between horticulturists of the United States and her good neighbors to the south. Appropriately enough, a feature of the conference was the "Rose Pan America," a new hybrid tea rose specially developed for the occasion.

The new flower made its debut at the June Festival of Roses in Wayne County, New York, with diplomatic representatives of Chile, Mex-



ico and Peru present. Picture shows Señora Raimundo Cuervo, wife of the first secretary of the Mexican embassy, cutting one of the new roses.

"Rose Pan America" is unusually large and notable for its coloring. The buds first appear reddish-orange, lightening to deep orange as the petals open. As the flower expands, the color fades into an orange and tawny yellow combination. The plant blooms continuously throughout the season, with a burst of even deeper colored flowers in the fall.

STUDIES CARIBBEAN FOOD AND HEALTH

At the suggestion of President Roosevelt, the Department of Agriculture has sent C. B. Munson, Collaborator of its Office of Foreign Agricultural Relations, to the Caribbean region, including the islands of Martinique and Guadeloupe.

to make a study of the food situation and of general health conditions in that area.

More than any other part of the Western Hemisphere, the Caribbean Islands have suffered a disruption of trade since the outbreak of war. The great majority of their exports were taken by Europe, and they imported from Europe most of their essential foodstuffs. European trade has now been cut off, and lack of any other market for the Islands' products has made it difficult for them to obtain exchange to purchase needed foods elsewhere.

For some time there have been reports of food shortages on the Islands, but thus far no detailed information on the seriousness of the situation or on the food items most needed has been received.

The Coffee Hemisphere—

(Continued from page 5)

tionable as excessive price increases and suggests considering the question of providing more direct means for price control within the terms of the agreement.

No specific steps have been taken under the agreement toward solving the general problem of coffee surpluses, and available information indicates that none of the Latin American countries has undertaken production control or other effective checks on output. This seems to be the basic weakness in the situation as it is difficult to see how a permanent adjustment of marketings through quota arrangements can be achieved without production being held somewhere near possible market outlets.

Apart from the marketing-control program, attempts to increase consumption of coffee are being made. The United States, on a per capita basis, is not the world's greatest nation of coffee drinkers. In normal times, it is surpassed by Denmark, Norway, and Sweden and equalled by

Finland and Belgium. The coffee trade believes we can be persuaded to drink more coffee and points for evidence to the fact that the average U. S. resident, who a few years ago was using less than 13 pounds of coffee a year, is now consuming more than 15 pounds. A large part of the credit for the increase is given to the joint promotional campaign of the Pan American Coffee Bureau, a producers' organization, and the National Coffee Association, which represents the United States industry.

Their campaign is financed by an assessment on coffee imported into the United States from Latin America. If coffee prices are high, the United States importer pays the assessment; if they are low, the Latin American exporter pays it. Most of the money is spent for paid advertising in newspapers, magazines, and trade papers; the rest for publicity and merchandising. Nutritive and stimulating effects of coffee are stressed, and considerable attention has been given to promotion of iced coffee as a summer beverage.

Another development that might increase consumption is the production from the coffee bean of a plastic material called cafelite. This product, now being manufactured in Brazil, can be used for floors, walls, insulation, utility appliances and novelty articles. The process is very new and only further experience will determine how much of the coffee surplus can be used in this way.

Many of the Latin American Republics depend on coffee in the same way that the southern United States depends on cotton. Like the South, Latin America is moving away from that one-crop economy toward more diversified farming. There will always be a lot of coffee grown and drunk in the Americas, however, and for a long time to come the strengthening of the coffee industry will stand in the forefront of American agricultural problems.

Francisco Castillo Nájera—*Our Mutual Friend*

GEOGRAPHIC link between the United States and the rest of the American world is Mexico, famed for its scenic wonders and mineral wealth and mecca of constantly increasing numbers of northern tourists. In the international tempest of today, Mexico has adhered closely to the policy of teamwork with the United States for the common defense of American democracy.

Diplomatic link between these close geographical and political neighbors is Dr. Francisco Castillo Nájera, Ambassador Extraordinary and Plenipotentiary to the United States since February of 1935. A long career in public and diplomatic life makes him an ideal head of Mexico's busy Embassy in Washington.

Born in Durango, Mexico, Dr. Castillo attended the Juárez Institute in his native city and was graduated from the Faculty of Medicine in Mexico City. Post-graduate studies in Paris, Berlin, Brussels and New York City included not only specialization in medicine but courses in political and social science and in archaeology.

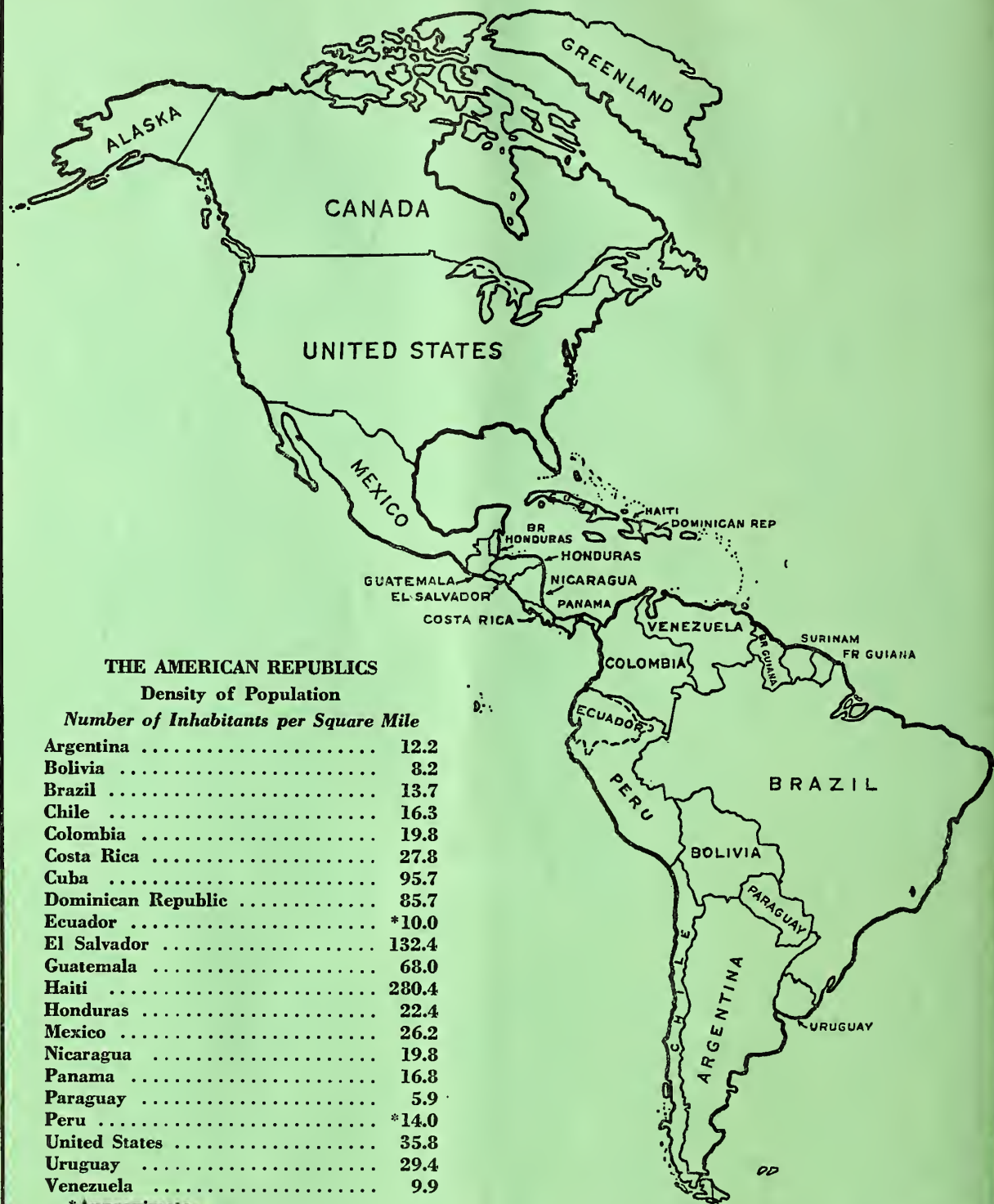
Few names are more distinguished in contemporary Mexican medical circles. Dr. Castillo has taught in Mexico's chief medical schools and has been director of the Juárez Hospital in Mexico City and surgeon general of Mexico. He has served his country in domestic and international public health programs of virtually every sort.

For years, Dr. Castillo has been intimately associated with the Mexican Army, in which he holds the rank of Major-General Physician-Surgeon. From 1915 to 1917, he saw active service in several Mexican campaigns. Later he was director of the Army Medical School, Surgeon General of the Army, and Director of the Military Hospital in Mexico City.

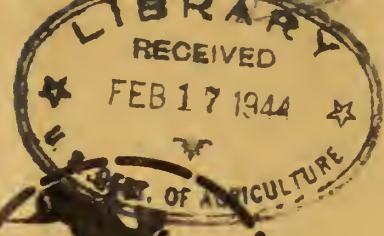
Early in his public career, Dr. Castillo became recognized as an able representative of his government at international functions, not only in the medical field but also in international relations generally. He represented Mexico at the Geneva Disarmament Conference of 1932, the League of Nations Assemblies of 1933 and 1934, the Eighth Inter-American Conference at Lima in 1938, and many others.

A great part of the time since 1922 he has been in diplomatic positions, serving successively as Mexico's envoy to China, Belgium, the Netherlands, Sweden, France and Austria before his present appointment.

He holds decorations from some 20 nations in addition to his own and, by royal decree, was awarded the medal of the Centenary of Belgium, the only non-Belgian ever to receive this distinction. If further evidence of Dr. Castillo's versatility were needed, it could be found in the list of his published works, which includes both volumes on medical subjects and publications in such varied fields as poetry, American archaeology and the Spanish language.



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Agriculture *Americas*

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November 1941

OFFICE OF FOREIGN AGRICULTURAL RELATIONS
UNITED STATES DEPARTMENT OF AGRICULTURE

Names and News . . .

TRADITIONALLY, names make news. In the field of inter-American agriculture a good deal of news involving names has occurred in the last few weeks. These items stand out.

NEW AGENCY: Coordinator of Inter-American Affairs *Nelson Rockefeller* has announced formation of a Division of Agriculture in his office. Its functions: primarily, to cooperate in establishment of a Tropical Institute, discussed on this page a month ago; in general, to maintain liaison with the Departments of State and Agriculture in planning, carrying out, and acting on results of agricultural surveys in Latin America. . . . Heading the new division will be *Earl N. Bressman*, formerly scientific adviser to the Secretary of Agriculture and more recently supervisor of the Department's Latin American activities as Assistant Director of the Office of Foreign Agricultural Relations. To his new position Dr. Bressman brings a sound background: degrees from Iowa State College and the University of Nebraska; coauthorship with Henry A. Wallace of "Corn and Corn Growing"; teaching experience in agricultural colleges of Iowa, New Mexico, Montana, Oregon; intimate acquaintance with most of the countries of Latin America. (For an article by Dr. Bressman, see p. 1.)

ECUADORAN MISSION: The Department of Agriculture has dispatched to Ecuador as the advance guard of a new agricultural mission *Walter R. Schreiber* and *William A. Larner, Jr.*, of the Office of Foreign Agricultural Relations. Joining the party later will be *Ernest G. Holt*, on loan from Soil Conservation Service as chief of mission, and four other agricultural technicians. Following up preliminary surveys, mission will delve deeply into problems of Ecuadoran agricultural economy. Its aim: to formulate, in cooperation with Ecuadoran Government, a program for agricultural diversification, including increased production of export farm products, notably rubber, carpet wool, and high-quality cacao.

SURVEY ENDS: Back from 3 months in Latin America are *James H. Kempton* and *Harry T. Edwards*, of the Bureau of Plant Industry. They surveyed agricultural possibilities of Mexico and Honduras; will report to those governments. Their return brings a total of countries thus surveyed to seven (Colombia, Cuba, Ecuador, Haiti, Honduras, Mexico, Paraguay). Peruvian survey is still in progress.

COMMITTEE MEMBER: United States State Department, appointing its Advisory Committee on Inter-American Cooperation in Agricultural Education for 1941-42, added to the membership *Homer J. Henney*, Dean of Agriculture at Colorado State College. Dr. Henney was formerly with Federal Crop Insurance Corporation in Washington; has traveled in Latin America. Rest of membership remains unchanged, with *Knowles A. Ryerson*, Dean of College of Agriculture at University of California, as chairman. Committee's purpose: to stimulate interest of land-grant colleges in inter-American studies.

CAN AMERICA PRODUCE SILK?

by EARL N. BRESSMAN*

ON JULY 25, 1941, United States trade with Japan was virtually terminated by a Presidential Executive order "freezing" all Japanese assets in this country. The immediate effect was an almost complete shutting off of United States imports of silk, almost 90 percent of which has come from Japan in recent years. As matters stand today, once storage stocks of silk are exhausted, there will be practically none available.

To the American public this prospective deficit struck closer home than would a shortage of manganese or tin or oil. The feminine motto was to buy first and ask questions afterward. The consequence was a march on women's wear counters of the United States, with limitation in sales to the customer in some stores and some price increases that were widely criticized as "profiteering."

Within a few weeks the excitement died down, since hosiery and underwear could still be bought at normal prices, but the emergency nat-

Principal stumbling blocks to American sericulture (the technical name for silk production) are the large amount of hand labor required in caring for silkworms and the expense of the "reeling" process, by which silk cocoons are unwound and several strands are blended to form thread. In the Orient this is done with machines operated by highly skilled workers. It has never been learned to any extent in the Americas. The suggestion has been made that American ingenuity in devising more efficient reeling machinery might counterbalance the abundance of cheap labor in the Far East, but little has been done in this direction.

The truth of the matter is that while silk is traditionally the most precious of the fabrics in general use, it has met a number of defeats in recent textile wars. The success of rayon has sharply cut down the amount of silk used for hosiery. Rayon and combinations of silk and rayon have now begun to be used for underwear, which previously had been almost exclusively of pure silk. Nylon hosiery was introduced to United States consumers for the first time in 1940 and met with an enthusiastic reception.

These are the principal reasons why the American republics, in their current drive to produce new crops, have given little attention to silk. The situation is altogether different with rubber, chief of the agricultural crops being encouraged in Latin America. Rubber is a native American product, once the basis of a thriving Latin-American industry. Furthermore, while silk substitutes are readily available, the production of synthetic rubber in large quantities and at competitive prices will take many years.

On the other hand, the Western Hemisphere would have some trouble adjusting itself to a completely silkless existence. United States silk imports in 1940, at the lowest level in 20 years, still amounted to 45 million pounds, valued at \$125,000,000. Natural silk is the principal raw material of our important full-fashioned hosiery industry, estimated under normal conditions to employ 100,000 workers, of whom perhaps a fifth lost their jobs in the first month after im-

urally brought up some questions about our prospects for obtaining silk in the future if Japanese silk should remain unavailable. Can the United States produce its own silk? the man in the street wondered. And has Latin America any possibilities as a source?

These are, of course, old questions asked frequently in the centuries since the New World was discovered. They have never been positively answered, although there is a distinctly negative tone to the reports on most of the serious experiments. The United States has the land, the climate, and the skill for silk production, but it is agreed that the cost of production would be high and development of the industry would take a long time. The same thing is true of Latin America, where Brazil, the only producer, falls far short of meeting its own needs. At this time the introduction of silk culture into the Americas would be a long and expensive process, involving an unprecedented degree of subsidization and assistance.

*For news about the author, see facing cover page.

ported silk became unavailable. Furthermore, there are some products, notably military parachutes and powder bags for large-caliber guns, for which substitutes have not proved thoroughly satisfactory to date. Under those circumstances, Western Hemisphere silk production would be highly desirable if some way could be found of making it economically feasible.

The history of silk goes back around 5,000 years. It originated with the Chinese, who kept it a secret for 25 centuries by refusing any silkworm eggs to foreigners. But the news leaked out to Japan and India and later reached the western world, so legend has it, through two monks from Constantinople, who visited China and upon their return made a report on the silk industry to Emperor Justinian, of the Byzantine Empire.

Silk In Its Heyday

As the years passed, the manufacture of silk became concentrated in the western countries, already prominent in other branches of the textile trade. The lush period of the seventeenth century French monarchy and its elegant court at Versailles launched the heyday of silk in Europe and made France for three centuries the center of the silk-manufacturing industry. This position is now held by the United States, which consumes almost three-fourths of world production of exportable silk. Through the centuries, though, the bulk of raw silk has continued to be produced in far eastern Asia, with the Near East and the Mediterranean Basin following as much more limited sources of supply.

This enormous industry is based on the silkworm, a native of eastern Asia, which is endowed by nature with a perfect insect life cycle. The worm, hatched from an egg, later undergoes a period of transformation into an inch-long moth that rarely flies, and then only for short distances. This change occurs inside a cocoon which the silkworm winds about itself from a fluid secreted within its body and expelled through an opening below the mouth. The fluid quickly solidifies into a fibrous thread, with each worm producing from 800 to 1,200 yards.

The silkworm eats green foliage, preferably certain species of mulberry leaves, and during the last 10 days before beginning to spin its

cocoon consumes about 20 times its own weight of leaves. When the cocoon is complete the insect within is killed by heating, the cocoon is soaked and unwound in a continuous strand, and the finished product is silk thread, ready for use in manufacturing. Some moths are allowed to burst their cocoons and lay eggs with which to carry on the race.

Physically, about the only condition needed for silk production is a climate where the white mulberry tree thrives. In the Western Hemisphere this means an area extending roughly from the Mason-Dixon line in the United States to northern Argentina. However, the close personal supervision required by the delicate worms and cocoons has given the peasant family on small holdings an exclusive advantage in the industry and has handicapped silk production in many countries where inexpensive labor is scarce, even though natural conditions are favorable.

The earliest New World attempt at sericulture is attributed to Cortés, who in 1522 imported silkworms and mulberry seeds into the "New Spain" that became Mexico. The experiment failed to last out the sixteenth century, but attempts have continued intermittently right up to the present day.

Too many of these attempts, unfortunately, have been of the "gold brick" variety, sponsored by fly-by-night promoters, who have long regarded silk, along with other exotic and unusual products, as fair game. Individuals, groups, and even whole governments have from time to time been duped by glowing promises of riches in this new industry. Few of the ventures have got beyond the tree-planting stage. This has led to a great deal of public skepticism on the subject and has made the way doubly hard for new promotions of reputable sponsorship.

The greatest Western Hemisphere progress has been made in Brazil, where the industry dates back to the early part of the last century. Lacking a technical organization and a market for cocoons, these early ventures failed, although Italian immigrants continued to introduce and breed silkworms in a crude fashion. During the last 20 years, however, federal, state, and municipal governments have stimulated private enterprises and given impetus to the production of cocoons and raw silk in Brazil, especially in the State of São Paulo.



AMERICAN SILK CULTURE has made its greatest progress in Brazil, where these pictures were made. Above, a workman picks cocoons from the mulberry twigs where they have been spun.



Pictures courtesy U. S. Consulate General, São Paulo.

(Left) *BROODER HOUSE* for silkworms on a plantation in the State of São Paulo. Men are holding branches with cocoons attached. Basket in foreground contains cocoons ready for shipment.

(Right) *SILKWORM* about 1 month old and a spun cocoon ready to be heated and unbound. The worm will spin its cocoon in about another week.



Five years ago silk culture in Brazil appeared to have a promising future. From an average annual production of 179 metric tons of cocoons for the period 1927-30, production increased to an average of 561 tons for the 5 years, 1931-35. In 1936 the figure rose to 600 metric tons. In 1937, production dropped to 393 metric tons, and the next year saw little improvement. This falling off in production has been attributed chiefly to a decline in world prices, which dampened the enthusiasm of those pioneering the crop. Large interests withdrew, some mulberry trees were removed, and for 2 or 3 years there were few new plantings.

Recently there appears to have been a revival of interest in silk production, and some increase in the amount produced has resulted. The 1939 cocoon crop for the State of São Paulo is estimated to have been 600 tons, and for the entire country it was almost 700 tons. Estimates for 1940 are about the same.

At best, however, Brazil plays a very minor role in world silk production. The 1939 crop amounted to less than one-tenth of 1 percent of Japan's production for the same year and was, in fact, only about 3 percent of Brazil's own consumption, the rest being imported. There are, however, certain factors in favor of silk production. Climatic conditions in São Paulo have been found exceptionally favorable for cocoon production. The mulberry tree bears leaves throughout the year. In the tropical areas of the country a crop of silkworms can be raised each month from one mulberry orchard. Even in temperate São Paulo, some growers have been able to obtain as many as eight crops a year, four times as many as normal Japanese practice.

The establishment of such an industry as sericulture on a large scale is fully in line with the desire of the Brazilian government to diversify the nation's agriculture. Several public institutions are maintaining experimental work in the belief that silk will play an important role in the future of Brazilian economy.

Elsewhere in Latin America there are many areas considered suitable for silk production. Cuba has been talked about for years as a possible site. As long ago as 1842, 200,000 mulberry trees were imported from the Philippines and planted on a Cuban estate. In 1928 plans progressed to the point of designating the south-

ern slopes of the mountains in the Province of Pinar del Río as suitable sites for the venture and appointing an Italian silk authority as consultant to the government. The National Ministry of Agriculture is continuing its experiments, but Cuban economists are reported to estimate that a rise in the price of silk of something like 100 percent would be necessary to make the venture profitable.

All Around the Map

Chile has tried to encourage silk culture through the Commission of Minor Industries of the National Board of Agricultural Exports, but has met with little success. In 1939 the Chilean government commissioned a sericulturist to go to Europe and Asia and study the silk industry, but there are no further reports on the program.

In 1936 the Argentine National Board of Education undertook a campaign to promote silk culture in the northern provinces of the country in order to cut down an annual silk bill of around 20 million pesos. One step was to instruct primary teachers throughout the country to impress upon their pupils the fact that silk was an industry from which thousands of humble Argentine folk might some day earn a living. The National Ministry of Agriculture joined in the campaign, and a good many white mulberry trees were planted, but there have been no further reports of success.

Colombia enjoyed a brief silk "boom" in the early 1800's, when a group of Catholic priests imported mulberry trees from the Philippines and silkworms from Spain and tried to launch the industry near Bogotá. Interest died out by 1845, although there are still many mulberry trees growing in Colombia.

Silk-production ventures turn up all around the map of Latin America. The government of Costa Rica in 1926 exempted domestically produced silk from payment of export duty, but this had no effect. The State of Chihuahua, Mexico, planted a grove of mulberry trees about 1930, but the great industry that was visualized never materialized. There are also reports of short-lived projects in Ecuador, Nicaragua, and Panama.

In the United States it is the same story, with variations, and it goes back to colonial days. In

1609 King James I of England tried to introduce the silk industry to the Colonies, but a shipwreck ruined the venture. It was tried again in 1619, unsuccessfully. In 1622 silkworm eggs, mulberry trees, and detailed instructions were sent over, but cotton and tobacco proved more attractive to the colonists.

Silkworm culture was to have been the major industry of the Colony of Georgia, according to the plan of Governor Oglethorpe and his trustees. In 1735, 2 years after the colony was founded, 8 pounds of silk were exported from Georgia. This increased to 700 pounds in 1758 and over 10,000 pounds the next year. After more than 20 years of trying, however, the Georgia colonists, who could not eat mulberry leaves and cocoons, abandoned the attempt in favor of growing their own food.

A South Carolina historian reports that a colonist named Sir Nathaniel Johnson made \$2,000 a year in the early 1700's by growing silk on his plantation, "Silk Hope." Connecticut got into the game in 1760 and for 85 years led all States in the amount produced. Pennsylvania and New Jersey became interested in 1765, but desisted in the late 70's in deference to a slight military engagement. After the Revolution, bounties for silk production were offered from time to time, notably by Pennsylvania and California, and the latter State revived the practice in 1866 without result.

One of the greatest booms in United States history was a silk-growing craze that swept the country in about 1838, reaching its peak in southern New England. Plants and crops of all kinds were displaced to make room for mulberry trees. Barely a year later the bubble burst, ruining thousands of speculators. Mulberry trees, which had been worth their weight in gold, could not be sold at any price. To climax the deflation, a blight broke out and destroyed most of the trees.

From 1884 until 1891 and again between 1902 and 1908 the Department of Agriculture conducted experiments in sericulture, financed by congressional appropriations, as an official test of the adaptability of the industry to this country. Bulletins and reports were issued, and silkworm eggs and mulberry cuttings were distributed to those interested. All of this was discontinued in 1908, and the publications issued

are out of print, although they may be consulted at some of the larger public libraries.

Summing It Up

Last summer, because of many requests, the Department of Agriculture's Bureau of Entomology and Plant Quarantine issued the following summary of the silk experimentation: "The investigations indicated that with reasonable care silkworm cocoons could be produced almost anywhere in the United States and that the mulberry, the food plant of the worm, also did well throughout the country. These studies indicated, however, that the cost of raising the cocoons and reeling raw silk was entirely too great to compete with imported raw silk coming largely from the Orient. Especially in the matter of reeling raw silk from cocoons, which requires special machinery and skilled operators, competition with the imported product appeared impracticable."

Reference to the excessive expense of the reeling process constantly recurs in any discussion of American silk possibilities. There is, however, another processing method, in which cocoons are not unwound but are crushed, and the mass is forced through tiny holes to form thread in a manner similar to that used in producing rayon. This was the method used by an eastern manufacturer in processing a batch of cocoons produced this year at the Alabama State prison farm, where one of the latest United States silk experiments has been launched.

The finished product is called spun silk, as distinguished from reeled silk. It is reported fairly satisfactory for some products, if not for silk hosiery. There are indications that some of the discouragements relating to reeled-silk production in this country may not apply to spun silk. At any rate, the subject remains to be thoroughly investigated.

Thus it has gone, down through the years, with sericulture in the Americas. So long as there is a market for natural silk in the Western Hemisphere, the question of the New World's ability to produce its own raw material probably will continue to be discussed. To date, the prospects are discouraging, but modern mechanical developments being what they are, the picture could some day change.

YOUNG AMERICA ON THE FARM

SEVERAL million young people now growing up on farms will be feeding and clothing the Americas tomorrow. That is why several of the American republics have programs for training their farm youth, both in technical skills and in citizenship.

Shown on this page are members of the United States Department of Agriculture-sponsored 4-H Clubs, oldest and largest of these youth programs and model for an increasing number of new ones. There are a million and a half 4-H Club members in the 48 States, Alaska, Hawaii, and Puerto Rico. Encouraged by the success of the Puerto Rican clubs, other Spanish-speaking lands of the Americas have adopted the movement. The 5-C Clubs of Cuba and the 5-V Clubs of Venezuela are active groups, growing rapidly. The Dominican Republic has recently established clubs of this type, calling them *Clubes Agrícolas Juveniles*. A similar program is reported under way in Haiti and one is planned in Chile.



UNITED STATES club members from Maryland pledge allegiance to the flag. Members are taught loyalty to country, community, and club.



CHILEAN flag is shown to group of club members from New Mexico and Pennsylvania by Miss Graciela Maudujano, assistant director of Institute for Rural Information of Chile, who plans to organize clubs in her country.



PUERTO RICAN 4-H girl with prize-winning canned goods, on display at Ponce Fair, the island's biggest rural exposition.

BIRTHDAY OF A BONANZA

by LOUIS C. NOLAN

JUST 100 years ago this month a United States diplomat in Peru reported a valuable discovery. The treasure was not gold, but guano—a rich nitrogen-bearing fertilizer that soon became an important item of Peruvian trade with the United States. This trade, now extinct, merits a niche in inter-American history as one of the first examples of Western Hemisphere teamwork for the benefit of agriculture.

It was on November 27, 1841, that James C. Pickett, of Kentucky, called the attention of his government to the vast deposits of guano lying unused on some islands off the Peruvian coast.

"A new source of wealth . . . has been recently discovered in Peru," he wrote to Secretary of State Daniel Webster. "It is a production called in the Indian language *huano*, and is generally supposed to be the excrement of marine birds. It is found in great abundance in some small islands a few degrees to the south of Lima and has been used in agriculture for manure from time immemorial. It was so used by the Indians before the Conquest . . ."

This keen-eyed diplomat gave the first official impulse to the development of an industry which for a quarter of a century was of mutual benefit to both Peru and the United States. Peruvian agriculturists and citizens generally profited because the guano deposits were the property of the nation, and the income from guano sales went a long way toward meeting the expenses of the Peruvian government and avoiding the necessity for taxes. American farmers benefited because they were in dire need of a good fertilizer for their depleted lands, and Peruvian guano was the best and about the only commercial fertilizer on the market.

The presence of the guano deposits off the Peruvian coast is due to a chain of circumstances. The Humboldt current from the Antarctic region bathes the semitropical coast of Peru with chilling waters, producing temperatures suited to the propagation of numberless fish. These fish attract the chief guano-producing birds—the cormorant (*guanay*), the pelican (*alcetraz*), the lancer (*piquero*), and the blue-footed booby (*camanay*)—which dip and dive in the blue

Pacific waters and come finally to rest on the rocky islands off-shore. There these birds leave their valuable excrement, a guano that contains from 12 to 16 percent nitrogen. Once the deposits are made, the dry and rainless climate preserves them indefinitely.

The high agricultural attainments of the Incas were due in no small degree to the fact that they carried guano from these islands and extended their cultivated fields far over the naturally arid regions. Thoroughly appreciative of these guano-producing birds, the Incas rigorously protected them by law and administered their guano industry so as to conserve this bountiful gift of nature.

But the rugged *conquistadores*, who exploited the matchless underground resources of Peru so thoroughly, left undiscovered and intact the guano wealth so plainly visible upon the surface. Lavish nature continued on through the ages to produce the rich nitrogenous deposits, heedless of the comings and goings of gold-blinded Spaniards.

Until shortly before 1841, when Pickett wrote his epoch-making letter to Secretary Webster, the guano deposits were virtually unknown to the outside world, but once commercial exploitation of the islands got under way, the industry assumed enormous proportions. In one 20-year period alone more than 10 million tons, with an export value ranging from \$20,000,000 to \$30,000,000, were extracted from one small group of islands. The surface of one island was lowered more than a hundred feet by the removal of its crust of guano.

Only a relatively small part of this guano, however, found its way into the United States market. Regular importation into the United States began in 1844, with Baltimore as the chief center of distribution. The South was the center of the demand. The exhausted tobacco lands in the upper South in particular, and the cotton lands in the lower South to a lesser extent, were strongly in need of the rejuvenating ammoniac properties of a suitable fertilizer. The use of guano consequently became widespread, and



H. Hinrichs photo.

Guano birds at home in the Pacific.

farmers became extravagant in their expectations of it.

At least one leading periodical expected an agricultural revolution. The editor of the publication, "Price Current," wrote in 1844: "And here begins another revolution—a revolution in agriculture. . . . All the worn-out tobacco lands in Maryland and Virginia, the sand hills along the seacoast of Virginia and North Carolina . . . all these will . . . become converted to the most arable and productive soils of the country . . ."

As we now know, no agricultural revolution resulted from the use of guano. However, since it did fill a crying need of North American farmers, it practically monopolized the United States fertilizer market down to the 1860's and continued to be an important item of trade between the two countries until about 1875. At that time, with the guano deposits greatly reduced, nitrate of soda from the Province of Tarapaca assumed greater commercial importance as a fertilizer.

Guano never again regained its former place in the United States market. Like many other products that can be made artificially, it yielded

to substitutes of similar properties. Today exports are of minor importance and go chiefly to nearby Latin-American countries.

The guano industry remains important within Peru, however, both to the government and to the farmers of the country. The enterprise is handled by the *Compania Administradora del Guano*, a government-sponsored corporation, which has several thousand employees and operates a small fleet. Under this system the fertilizer is furnished to farmers at moderate prices, and the demand far exceeds quantities the company is equipped to supply. In 1940, for instance, orders were placed for 229,000 metric tons of guano, but only a little more than half that amount was obtained. It is apportioned to farmers on the basis of their soil-conservation needs, an arrangement that prevents overexpansion of the industry and depletion of the supply.

While Peru now ships no guano to the United States, its introduction and use in this country is notable in the chronicle of inter-American trade relations as an early instance of the supplying of one American nation's needs from the abundance of another.

CRADLE OF THE AMERICAS

by PHILIP LEONARD GREEN

WHEN Christopher Columbus first journeyed to the eastern part of the island he called Hispaniola he found a land which the native Indians called *Quisqueya*, "Mother of the Earth." Today that land is the Dominican Republic, which shares the West Indies island with the Republic of Haiti.

Whatever the native reason for calling their country "Mother of the Earth," it certainly earned that description in the glorious period of Spanish exploration that followed Columbus' arrival. *Quisqueya* was the starting point for a fanlike migration of men and women to all parts of the New World.

On the island was founded Santo Domingo, which now is called Ciudad Trujillo, and is the capital of the Dominican Republic. Oldest permanent settlement of European origin in the Americas, it was established August 4, 1496, by Bartholomew Columbus, brother of Christopher, and named for his patron saint and his father, both of whom were called Domingo. Here was celebrated the first mass on American soil. Here was established the first European government in the Western World. Here, too, one may still see some of the first monuments of the white man's civilization in America.

While the Spaniards were pushing out from Hispaniola in various directions toward continental America, Santo Domingo was the hub in the vast and growing zone of Spanish influence in the New World. It was the seat of the first archdiocese in the West Indies, and its Royal Audiencia held the reins of political power over all the Antilles. The first university of the Americas was Santo Domingo's St. Thomas of Aquinas, which came into being in 1538—almost a hundred years before Harvard.

In order to symbolize the unique position occupied by this country as the "Cradle of the Americas," the government of the Dominican Republic has for some time contemplated the erection of a Columbus Memorial Lighthouse. Other American nations have been invited to participate in honoring the great admiral. The

United States, through a resolution of Congress appropriating nearly a million dollars and through numerous official statements, has signified its approval of this proposal.

The Dominican Republic has grown tremendously in the last century. At present it contains over 1,500,000 people as compared with an estimated population of about 54,000 inhabitants in 1824. Even since 1921, when the first official count was made, the population has almost doubled. According to present estimates, the density of population is about 85 to the square mile, exceeded only by Haiti, El Salvador, and Cuba among all the American republics. Even so, some parts of the country still offer opportunities for settlement because of uneven distribution of the population. The settlement of refugees at Sosúa (see "Refugee-Farmers at Sosúa," p. 12) is an attempt to utilize such regions, while at the same time providing opportunities for refugees to establish themselves in the New World.

The original Indian strain has long since lost its identity in the population picture. About two-thirds of the inhabitants are of mixed races, about one-fifth are Negroes, and about one-seventh are European, mostly of Spanish origin.

Like the population, fertility of the soil is unevenly distributed throughout the Republic. Since the people's livelihood comes mainly from agriculture, this factor takes on far greater importance than it has in countries where mining and industry furnish other sources of income.

Like most Caribbean countries, the Dominican Republic depends on a small number of agricultural products for its income. Sugar is by far the leader, accounting for three-fifths of the income from exports. Another fifth comes from cacao and coffee. Dominican cacao, incidentally, is of unusually high quality. Tobacco, corn, beans, mangos, and pineapples are also grown.

Recently strenuous efforts have been made to promote the growth of other products, both in order to free the country from its dependence



Pictures courtesy Dominican Legation, Washington.

Forest scenery abounds in the Dominican Republic. At the left is an irrigation canal; at right, a jungle landing.

on imports for such widely used foodstuffs as rice and wheat and to develop new sources of income. Highways have been built in the interior to make it easier for farmers to bring their crops to market. Improvements in harvesting, grading, packing, and marketing have been sought. Certain agricultural industries, such as banana growing, have been expanded. Essential oil crops are regarded as a potential field of development, as are forest industries, at present greatly hampered by lack of adequate transportation facilities. Dominican mahogany is considered by some experts to be of the highest quality.

Because of the government's interest in agricultural and industrial expansion, it is extremely friendly to investments from abroad. Thus, from being at one time one of the least stable of countries, the Dominican Republic has become one of the easiest in which to do business.

The Republic is readily accessible from United States ports. From New York to Ciudad Trujillo takes 5 days by steamer, but for those who require speed the airplane has cut this to 7 hours. Within the Republic there are about

3,000 miles of highways and roads. The capital is connected with the rest of the country by three main highways. The country is also crisscrossed by a network of telephone and telegraph lines and is connected with the United States by cable and wireless communications.

Although situated in the tropics, the Dominican Republic has an ideal climate. The mean temperature in different parts of the country is from 74° to 77° F. The plains of the Constanza Valley and other interior regions are not infrequently covered with frost during the cooler season and temperatures of around freezing have been known in some areas during the period between December and February. Rainfall is generally heavy, but in some regions of the north the government has had to undertake irrigation projects in order to supply sufficient water to farmers in those parts.

Within the past few years the Dominican Republic and the United States have moved closer together in a program of mutual cooperation, to which both governments have firmly pledged themselves. One of the outstanding events took place when the two Republics signed a conven-

tion on September 24, 1940, under which the Dominican Republic resumed control over the collection of its own customs. (For many years such collections had been in charge of an official appointed by the President of the United States.) At the same time provisions were made for the payment of debts owed to United States creditors.

The Export-Import Bank has set aside \$3,300,000 to lend for public works and other purposes. Among the items included are \$160,000 for a hotel in Ciudad Trujillo and \$250,000 for a slaughterhouse and refrigeration plant which should improve the standard of living by providing the people with much-needed fresh meat. The Dominican Republic was also one of the first countries to receive aid under the Lend-Lease Act.

Recently the Dominican Republic, like many other American Republics, has lost heavily through virtual disappearance of its non-American markets. Consequently, every effort is being made to revamp agricultural production so that more of the commodities that the United States needs may be grown. But before this is done, investigation of the actual situation and potentialities must be made, and that requires time and money.

Now, in many countries, the United States Department of Agriculture assists by providing experts to help study just such problems. In the case of the Dominican Republic it has been particularly fortunate that a private institution—the Falk Foundation of Pittsburgh—has interested itself to the extent of making funds available for a complete survey. This is being conducted by the Brookings Institution and covers economic, medical, and social phases of the Republic's life. While at first sight it may not seem as dramatic as many of the things that are being attempted today, it is one of the most far-sighted pioneer efforts to aid hemisphere solidarity, and that is bound to have practical and lasting results. Indeed, the Dominican Republic may again take up its historic role as a center from which new ideas and new initiatives may radiate.

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Some of the oil wells in Lake Maracaibo, Venezuela, are drilled eight miles off shore.

READING

About the Americas

(This department has been established because of numerous requests for suggested reading material on the Americas. Inclusion in or omission from the list should not be regarded as appraisal of a publication.)

Economic Defense of the Americas. Percy B. Bidwell: 96 pp., World Peace Foundation, Boston, 1941. Discusses effects of war, propaganda, German economic penetration, weapons of economic defense and hemisphere self-sufficiency. Seven tables and bibliography.

Songs of the Americas. Florence Hudson Botsford, Ed.: 107 pp., G. Schirmer, Inc., New York, 1930. Words and music of selected songs. The Latin American songs are translated into English.

The International Conferences of the American States—First Supplement: 558 pp., Carnegie Endowment for International Peace, Division of International Law, Washington, 1940. Contains documentation on official and private Pan American conferences.

The Romance and Drama of the Rubber Industry. Harvey S. Firestone, Jr.: 135 pp., New York, 1932. A collection of radio talks.

Rubber and Its Use. Harry L. Fisher: 128 pp., Chemical Publishing Co., New York, 1941. Gives history of rubber industry, sources, production, processing, and derivatives. Bibliography organized by topics.

Rubber Latex. M. A. and W. H. Stevens: 224 pp., Chemical Publishing Co., New York, 1940. Deals with sources, production, processing and marketing of rubber latex.

A New Doctrine for the Americas. Charles Wertenbaker: 211 pp., Viking Press, New York, 1941. Treats of Pan American conferences from 1933 to 1940, personalities of Latin American and United States participants, Good Neighbor Policy and hemisphere defense strategy. Has comparative chronology of events in Eastern and Western Hemispheres, May 10 to Dec. 31, 1941. Journalistic style.

Rubber. A Story of Glory and Greed. Howard and Ralph Wolf: 533 pp., Covici Friede, New York, 1936. Discusses wild and plantation rubber, manufacture and sale. Bibliography.

REFUGEE-FARMERS AT SOSÚA

by JULIUS MORITZEN*

ON THE northern shore of the Dominican Republic, near the port city of Puerto Plata, young men and women refugees from the turmoil of central Europe are beginning a new life. Far from their native lands, these young people—most of them city bred—are learning the good farm life of the New World, and they are liking it.

They are the advance guard—400 strong—of the Sosúa settlement, most ambitious project in the Western Hemisphere for the resettlement of European refugees. Now nearing its second birthday, the experiment is bearing fruit that seems to assure future progress.

It all began a little more than 2 years ago, even before the outbreak of the present war, when President Roosevelt called the Evian Con-

*Mr. Moritzen is a New York writer on international affairs. Among his works are "The Peace Movement of America" and "Georg Brandes in Life and Letters." He has in preparation a book on the Dominican Republic, to be ready for publication in 1942, the year of the 450th anniversary of the discovery of America.

ference of 32 nations to consider the distress of the Jewish people of central Europe. Only concrete proposal to come before that conference was an offer of President Rafael Leonidas Trujillo Molina, of the Dominican Republic, to permit gradual settlement of up to 100,000 refugees on his personal property of 27,000 acres at Sosúa. It is one of the most fertile and beautiful regions of this Caribbean republic. (See "Cradle of the Americas," p. 9.)

The next step was to determine the adaptability of the land for colonization through a survey made by President Roosevelt's Committee on Political Refugees. The survey party, composed of scientists lent by the United States Department of Agriculture, delved into every phase of the problem—soil, health, climate, and crops. Their conclusion was that no more ideal spot than Sosúa could be found.

The project really began to move after the incorporation of the Dominican Republic Settlement Association, commonly known as Dorsa. Credit for bringing Dorsa into existence goes to

James N. Rosenberg, New York attorney and philanthropist, who had had experience with population resettlement problems elsewhere, particularly in Russia. He already knew of the work of Dr. Joseph A. Rosen, who had been in Russia as agricultural expert for the American Relief Administration, which, under Herbert Hoover's direction, fed famine-stricken post-revolutionary Russia. Beginning in a small way by bringing 23 poor Jewish families from Odessa and settling them in the Crimea, Dr. Rosen had by 1938 assisted in the establishment of 300,000 refugees as self-supporting farmers. It was Dr. Rosen, then, who was chosen to direct the Sosúa Settlement for better or for worse. A personal survey convinced him that the project was thoroughly feasible. With Dr. David J. Sweitzer as his assistant he took charge of the colony and of the office headquarters at Ciudad Trujillo. The Falk Foundation of Pittsburgh, of which Leon Falk is president, volunteered its services and from the start rendered valuable assistance, financial and otherwise.

An example will show who the settlers are and how they are adapting themselves to their new homes. Consider the A——'s, a married couple in their early thirties. In March 1940, after months of wrangling over traveling credentials, they left Munich, Germany, and arrived in Sosúa in May with the first group of colonists to reach the New World haven. In the homeland, 5 years earlier, they had been a normal newly married couple, he with a future before him in the textile business. They had begun the purchase of a small suburban home. At the time they left they were near poverty—property and prospects gone.

For the first 6 months of their residence in Sosúa they lived in the community barracks of the settlement, learning to adjust themselves to new foods, new daily routines, and the physical labor neither of them had done before. Many of their hours were spent studying Spanish, the official language of the Republic and of the colony.

Dorsa guaranteed them a year of this maintenance and training, but at the end of 6 months



Sosú a settlement, across the bay.



One of the new dormitories, built by settlers.



Lunch hour in the community dining hall.

Pictures by Foto Conrado. Ciudad Trujillo.

they were deemed ready for a venture on their own and moved to their own homestead. This consists of a small but substantial frame dwelling with electric lights, running water, and a refrigerator. With it go about 10 acres of land, some tools, and essential livestock. The sum total is valued at \$1,600, which they will begin to repay to Dorsa after 2 years.

The A—'s are farming their own fields, growing most of their own food, and beginning to harvest some crops for cash sale. What they do not grow they buy at the Sosúa cooperative store. Their home and their farm fill most of their hours; such leisure as they have is spent in horseback riding or in swimming.

Multiply this little family by some scores and you get the idea of the problems that beset Dorsa in its beginning—selection of settlers, passports and visas, and sailings, adjustment to environment, medical care, temperate zone people in the tropics, city people on the farm—all these and many more. There was even the special problem of the baby smuggled in by the first arrivals in the days before there were facilities for families with children. Even yet, incidentally, there are few such families in the colony, which is largely made up of single men and women and fewer young married couples.

It will be difficult, admittedly, for the colonists to obtain sufficient incomes to repay their loans and at the same time maintain the standard of living near that to which they are accustomed. They are counting heavily on the increased production they can attain by mechanized farming and on the advantages that cooperative production and selling will bring them. They are planning, too, to introduce a variety of new crops which the United States is interested in seeing produced in the Western Hemisphere to complement its own agricultural production.

With the encouragement of Dr. Atherton Lee, director of the United States Agricultural Experiment Station in Puerto Rico, several essential oil plants have been started. Among these are lemon grass, citronella grass, and ilang-ilang, which enjoy a good export market as sources of perfumes and drugs. A new export article for the Dominican Republic will be castor beans, for the cultivation of which 1,000 acres have been set aside. A United States corporation has contracted to purchase from Dorsa large quan-

ties of castor beans. Bamboo cultivation has also been suggested as a useful addition to plant development in the colony. Shoots have been obtained from a variety which was developed in Puerto Rico and which is resistant to termites.

Among the crops already successfully grown at Sosúa are bananas, coconuts, yucca, sweet-potatoes, mangos, and a variety of other vegetables and fruits usually produced in the subtropics. The dairy industry gives promise of becoming valuable to the colonists. Special attention is given to cheese making, and a considerable quantity is already finding its market in other sections of the country, which previously have used little in the way of dairy products. An excellent herd of cattle was provided from the start, and supplies of milk are plentiful. There is, in addition, a variety of poultry. Few farmers of the United States are better equipped, either for self-sufficiency or for sale to others.

Anniversary Evening

On the evening of January 31, 1941, which marked the close of the colony's first year, an inspection party arrived at Sosúa. For this group the visit was a demonstration that the colony is fated for a promising future. That nobody is allowed to go hungry was attested by the fine array of food served, all of it grown right there in the colony. The theatrical performance that evening would have done credit to professionals, which, indeed, many of the performers were in their native lands. It was an evening of gaiety, fellowship, and good will.

Wartime curtailment of transportation between the United States and Europe has imposed a barrier to more rapid growth of the colony by seriously handicapping Dorsa's efforts to transplant the additional refugees eager for the journey. The end of the war will improve this situation. Dorsa's plans, it should be noted, go beyond the end of the emergency, for there are few among the colonists who think of eventual return to Europe. Sosúa is their home, and there they plan to remain, making it an ever more inviting haven for the relatives and friends they left behind.

To deal with expanding needs there are 50,000 acres available in addition to the 27,000 acres already occupied. This land has likewise been

AGRICULTURAL FRONT

NEW BRAZILIAN CHEMICAL PLANT

A plant manufacturing a varied line of chemicals, either not heretofore produced in Brazil or produced in insufficient quantities to supply local demands, began operations this year at Barigui, State of Paraná, Brazil. Emphasizing the national character of the enterprise, the plant is capitalized by individuals or firms of the State of Paraná: all its officers, technicians and employees are Brazilians; and, with the exception of the electric power generation installation, all material used in construction was locally produced.

OLIVE GROWING IN ARGENTINA

The Ministry of Agriculture of Argentina has created an advisory committee on olive cultivation, designed to promote and coordinate the development of olive tree cultivation of the country.

Argentina has ideal conditions for olive cultivation. Encouragement of the crop, it is believed, will provide a source of income in poor districts which are unsuited to other crops and will diversify farming in other areas.

EXPORTS FROM DOMINICAN REPUBLIC

The Dominican Republic reports some recent export shipments of rice and corn to the small islands in the West Indies. Cuba and Puerto Rico are also taking these products in constantly increasing quantities. These new outlets are partially compensating for the loss of European markets for tobacco and cacao.

CHEMICAL PLANT FOR COLOMBIA

A notable addition to Colombia's industrial set-up will be the construction of a chemical plant, to be completed within two years at one of the Government-owned salt mines. Output of the new plant, chiefly caustic soda, carbonate and bicarbonate of soda, will relieve a small part of Colombia's heavy dependence on chemical imports.

PAN AMERICAN FOOD FIESTA

The American housewife can now gain many new ideas for imparting a "Pan American" flavor to her daily menus.

To inform the public about the many delicious foods and drinks available in this country from Latin America, how to prepare them, and where to obtain them, a "Pan American Food Fiesta" was held recently in New York City. For three days, an exhibit called "Foods America Gave the World" was on display. Programs planned to interpret life in the Americas south of the United States were included.

FURS FROM LATIN AMERICA

Latin American furs represent one of the most encouraging prospective fields of development of inter-American trade, according to the Luxury Trades Adviser to the Coordinator of Inter-American Affairs.

Furs originate chiefly in the eight seacoast countries of South America and in Mexico, where their variety is extremely wide. Among

offered by General Trujillo. On the whole, land for cultivation is plentiful throughout the Republic, which, with three times the area of neighboring Haiti, has only half its population.

The part that Sosúa colony can play in the future development of the Dominican Republic was recognized by General Trujillo, when, in making the offer of this property, he wrote: "I am deeply interested in cooperating in a practical way with the humanitarian plans of Presi-

dent Roosevelt. I hope that the immigration of European refugees to the Dominican Republic will stimulate the progress of our country and will intensify the development of our natural resources as well as our industries."

The first arrivals at Sosúa have accepted the Generalissimo's definition of their responsibilities along with his fine gift. They are proving worthy additions to the Western Hemisphere community of good neighbors.

the most highly valued are the vicuña, which comes from a small llama and is so rare that its export is often forbidden, and the nutria, supplied by the coypu, a beaver-like river rodent. Others include coney, ocelot, zorrinos, and leopard cat, besides the familiar raccoon, otter, opossum, and lamb of different types. Fox is produced, although neither the silver nor the black pelts.

U. S. imports of nutria skins alone from Latin American showed a 260-percent increase from 1939 to 1940, and the increase is expected to continue.

BRAZILIAN AGRICULTURAL SCHOOLS

To teach young Brazilians efficient and scientific agriculture, the Ministry of Agriculture has established ten rural agricultural schools throughout the country.

One of the best organized of these training schools is "Vidal Negreiros," situated at Bananeiras, in the State of Paraíba. "Vidal Neigreiros" is planted to trees, vegetables, flowers, and cereals. The students grow wheat, manioc, tobacco, beans, and peppers to meet the school's own needs. It is equipped with departments of physics and chemistry, with laboratory facilities for checking experimentally the theoretical aspects of classroom study. At the request of landowners in the area, the enrollment of the school was increased in 1940 from 150 to 180 pupils.

The government is planning more of these schools throughout Brazil for the training of competent agriculturists.

AGRICULTURAL APPOINTEES

The Department of State, augmenting the personnel of its Latin American missions during the emergency, has appointed two members of the staff of the Office of Foreign Agricultural Relations to positions abroad. They are Edgar R. Burkland, who will be stationed in Rio de Janeiro, and James Parker Wilson, assigned to Santiago. Both will do economic analysis in the field of agriculture.

MERCHANDISING ADVISORY SERVICE

A Merchandising Advisory Service has been established in New York City to contact outlets in the United States for goods originating in the other Americas. It will stimulate orders and advise manufacturers in Latin America on well-designed and correctly priced items that will meet a ready market in the United States.

COLOMBIAN NATIONAL COUNCIL ESTABLISHED

The establishment of the Colombian National Council, headed by Mariano Roldán, Minister of Economía Nacional and Chairman of the Instituto de Fomento Industrial, has been announced. It is the eighth of 21 councils being established by the Inter-American Development Commission in its program for stimulation of trade among the Americas.

Arrangements for the establishment of the council were completed recently in Bogotá, where an initial meeting was held. Similar councils, composed of outstanding business, professional and technical men have been formed in Argentina, Bolivia, Brazil, Chile, Paraguay, Peru and Uruguay.

ARGENTINA TO MANUFACTURE MEDICINES

Greatly increased local manufacture of medicines in Argentina is expected as one of the outstanding effects of the European war. Since most of the supplies from Europe have been cut off, plans are being made, in collaboration with Argentine scientists and under control of authorities, to engage in large-scale production of drug plants and drugs in order to make the country self-sufficient so far as essential remedies are concerned.

The Secretary of State of the United States and diplomatic representatives in Washington of the Latin American Republics make up the Governing Board of the Pan American Union.

Manuel de Freyre y Santander—*Our Mutual Friend*

NO NATION in the Americas has a longer or more colorful history than Peru, ancient center of the far-flung Inca Empire. Peru's oldest cities were founded, its fields were tilled, and its mineral depths were plumbed centuries before Europeans came to the Western Hemisphere. Later the Spaniards ruled all of northern South America from Lima, making it a capital of world-renowned wealth and beauty. Through all the years since, Peru, as a nation, has maintained an assured place in international councils.

Thus it is fitting that in Washington, where much international activity centers today, Peru's Ambassador, Manuel de Freyre y Santander, should stand as dean in length of service among all the ambassadors to the United States. His 11 years at the helm of the Peruvian Embassy in Washington represent a long period of diplomatic service in the same post—particularly under the stirring conditions of the last decade.

Few foreign diplomats have a greater first-hand acquaintance with the United States than Señor Freyre, who spent a considerable part of his life in this country before he was named Ambassador in 1930. He was, in fact, born in Washington at the time that his father, Col. Manuel Freyre, was Peru's Minister to the United States. He received his early education in the United States, then studied civil engineering at the Universities of Pisa and Lausanne. Before entering the diplomatic service he was active in engineering circles in Peru.

He began his public career as attaché of the Peruvian Legation in Berne in 1902. Followed 4 years in his country's legation at Bogotá, and then his first appointment to the United States—a 12-year assignment that included service as first secretary and then as Minister Plenipotentiary.

He later was Peruvian Minister to Japan and China, Colombia, and Argentina, and served as Peruvian delegate to the Plebiscitary Commission of Arica, which in 1924 arranged for peaceful settlement of the Tacna-Arica boundary dispute between Chile and Peru. Señor Freyre then served 5 years as Minister to London before his return to Washington.

During his career he has been honored with a number of decorations, including the Grand Cordon of the Order of the Sun of Peru, the Cross of Boyacá of Colombia, the Sacred Treasure of Japan, and the Golden Sheaf of China.

Experience, vigor, and intelligence combine to make Señor Freyre an excellent representative of his country in the turbulent international whirl of today.



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Agriculture IN THE *Americas*



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December 1941

OFFICE OF FOREIGN AGRICULTURAL RELATIONS
UNITED STATES DEPARTMENT OF AGRICULTURE

Names and News . . .

MORE names and more news about activities of recent weeks affecting agriculture and farm people in the Americas:

BOLIVIAN SURVEY: Latest group of U. S. technicians to be assigned to Latin America is the party now surveying agriculture, roads, and mining in Bolivia. The survey, based on an exchange of notes between the Bolivian and United States governments, is expected to last 6 months. The goal: a thorough technical and economic study of the communication needs and of the agricultural and mineral potentialities of a land rich in undeveloped resources. Representing the Department of Agriculture on the survey party will be *Wilbur V. Harlan*, agriculturist of the Office of Foreign Agricultural Relations, and *B. H. Thibodeaux*, economist of the Bureau of Agricultural Economics. Their associates: technicians from the Bureau of Public Roads of the Federal Works Agency and from Interior Department's Bureau of Mines.

PAN AMERICAN FIESTAS: When citizens of Greenfield, Iowa, held a Pan American Fiesta last April they started something. Since their pioneer effort fiestas on the same pattern have been held in other small cities of Missouri, Iowa, Nebraska, and Colorado. Community celebrations are planned and staged by local residents. The Department of Agriculture cooperates by supplying material for window exhibits on Latin-American countries and products. Exhibits shown during November in several California cities and at Kansas City's Midwest Defense and Industrial Exposition will be sent to Miami, Fla., December 29, returned to Washington January 17 for a 3-week display in the Department of Agriculture patio.

TRADE AGREEMENT: Argentina and the United States on October 14 signed an epoch-making trade agreement, climaxing months of negotiations, signaling perhaps a new era for inter-American trade. Agriculture, supplier of much of the material of commerce, is vitally concerned. In his article, "A New Link With Argentina," on p. 11 of this issue, *Dr. Louis C. Nolan* of the Office of Foreign Agricultural Relations explains how the agreement affects farmers and their products. His more detailed study on the same subject appears in the November issue of "Foreign Agriculture."

NEW APPOINTMENTS: Additions to the staff of the Agricultural Division of the Office of the Coordinator of Inter-American Affairs are *Atherton Lee* as assistant director and *Robert A. Nichols* as senior agronomist, the latter to work chiefly on subsistence farming. Mr. Lee has been for years director of the U. S. agricultural experiment station at Mayagüez, Puerto Rico; Mr. Nichols has headed a similar station at St. Thomas, Virgin Islands.

RESEARCH IN TROPICAL BRAZIL

by FELISBERTO C. CAMARGO

SOMETHING new is stirring in Brazilian agriculture. One of its symptoms is the Instituto Agronômico do Norte (Northern Agricultural Institute), a modern research institution that has been carved out of the jungle near the historic city of Belém in the State of Pará. Recently completed, culminating the dreams of far-seeing Brazilians, the Instituto is physical evidence that Brazil is awakening to the potential agricultural importance of the vast Amazon Valley.

The new institution has been designated as the center for agricultural research for all of the northern half of Brazil. Here will be assembled scientists skilled in tropical agriculture. From these headquarters research workers will filter out into the farthest reaches of equatorial Brazil to serve the farmers of that vast area.

Establishment of the Instituto initiates a new policy of the Ministry of Agriculture of Brazil.

THE AUTHOR.—Dr. Camargo is the Director of the Instituto Agronômico do Norte of Brazil, of which he writes. Long an energetic leader in Brazilian science, he was formerly on the staff of Campinas Experiment Station at São Paulo. The article appears in translation from Portuguese. At the close of Dr. Camargo's article on p. 5, is an account by Dr. T. D. Mallery, of the Bureau of Plant Industry, United States Department of Agriculture, of the progress of the Western Hemisphere rubber project in Brazil and the Instituto's contributions to it.

It is a move toward transforming the specialized one-crop experiment stations of former times into coordinated scientific units.

In the past the national policy was to create experiment stations and institutes, each dealing with only one crop or commodity. Thus, for years, there have been experiment stations for research on bananas, on wheat, and on fruit; and institutes for coffee, maté, alcohol, and other products. These organizations, with their extremely limited spheres of scientific activity, were closely connected with, and directly responsible to, the Presidency of the Republic.

The advantages expected from this system were the elimination of endless government "red

tape" plus the greater prestige and freedom of action supposed to stem from the proximity to the Chief Executive. However, as the system expanded, it was discovered that it did not work in a large country such as Brazil, with its great variety of soils and crops and its multitude of economic problems. Gradually the restricted experimental units became so numerous that it was necessary to set up an independent administrative service to supervise all of the various stations and institutes. In addition, with so many agencies carrying on similar work, it became increasingly difficult to find trained technical personnel to staff them. Even when it was possible to bring in scientists from abroad, there still remained the problem of the large number of similarly equipped laboratories with their accompanying fragmentary libraries. Obviously the resultant situation was extremely costly and did not attract public interest in the scientific program.

The economic importance of initiating investigations for increasing rubber production in Brazil has long been recognized. Under the former policy it would have been logical to create a "rubber institute" to carry on all work relating to rubber culture, production, and trade. This was proposed, in fact, but it was vetoed by the Brazilian Government's agricultural leaders and a system of agricultural institutes was set up instead, with rubber investigations as only one phase of the coordinated program. In accordance with this plan, the Instituto de Experimentação Agrícola, with headquarters in Rio de Janeiro, divided the country into geoeconomic regions, each with headquarters from which are supervised the activities of a network of experiment stations strategically situated in the respective areas.

The geoeconomic region of the North, supervised by the Instituto Agronômico do Norte, comprises the States of Amazonas, Pará, and Maranhão; the northern part of the States of Matto Grosso and of Goyaz, and the Acre Territory. This region may be identified further as the Brazilian portion of the Amazon Basin and that part of the State of Maranhão which has an Amazonian climate, namely, the small river valleys of the Gurupy and Tury-Assú. Thus the

geoeconomic region of the North represents nearly 50 percent of the total area of Brazil. It is the largest equatorial region in the world suitable for agricultural development.

This is the vast region that will be served by the Instituto Agronômico do Norte from its headquarters near the mouth of the Guauá River of the Amazon River system. Along the principal tributaries of the Amazon various sub-experimental units will be established for the study of their agricultural possibilities. This multiplication of experimental units is made necessary because each of the principal valleys in the Amazon River system has a more or less distinct combination of soils and climate. Typical examples of this are the valleys of the Tapajoz, the Madeira, and the Jurua Rivers. In addition to these valleys, with their individual characteristics, there are certain geographic regions, such as Brazilian Guiana in the east, the area between the Solimoes and the Negro Rivers in the extreme west, and the islands of the Amazon delta, which, because of their diverse climates, also will necessitate local substations.

These substations, that is, the cooperating experiment stations, experimental test plots, nurseries, or extension service depots, as the particular situation may warrant, will be connected with, and supervised by, the Instituto Agronômico do Norte, which in turn functions under authority of the Instituto Central de Experimentação and the Centro de Ensino e Pesquisas Agronômicas. One of the principal functions of the Instituto, therefore, is to direct and coordinate scientific agricultural research throughout the northern region for the purpose of improving the agricultural economy.

As its primary activity, the Instituto Agronômico will conduct scientific experiments in plant culture, but, by virtue of powers delegated to it by the Ministry of Agriculture, it will also collaborate actively and freely with other branches of the Brazilian Ministry of Agriculture in such activities as the economic production of agricultural commodities on a commercial scale. Thus, the Instituto Agronômico do Norte not only is an organization for coordinating experimental agriculture in the Amazon Valley and for studying economic plants scientifically, but it also will collaborate with the services of agricultural economics, meteorology, immigration

and colonization, fish and game, agricultural development, ecology, agricultural education, and other branches of the Ministry.

Although the Instituto is surrounded by jungle as dense as any to be found in the Amazon Valley, it is by no means isolated, since it lies in the outskirts of Belém, only a few miles from the central portion of that thriving metropolis of 200,000. It consists of 10,000 acres of gently undulating land, at the entrance to which an area of some 25 acres has been cleared as what might be termed the "campus." Symmetrically arranged about this central plot are the 48 buildings, which include 2 laboratories, an administration building, 11 large residences, 20 small residences, 2 dormitories, a school, orchid house, observatory, and service buildings. All are of modern tile stucco construction, with white walls, red tile roofs, and metal sash windows and doors. On the ground or from the air, this central quadrangle is an impressive sight.

The soil of the area is sandy loam underlaid with yellow to reddish-yellow friable clay. The land is ideal for nursery culture, since it is easy to till and is favorable for transplanting.

An outline of the Instituto's organization will serve to indicate its functions, both those of the present and those planned for the future. There will be seven divisions—one of Administration, one of Extension Service, and five for agricultural research, to be known as the Divisions of Plant Improvement, Soils, Biology, Experiment Stations, and Technology.

The Division of Plant Improvement will be concerned with the improvement of all plants of economic importance in the northern geoeconomic region and will study the problems of genetics as applied to plant species of the equatorial and tropical world. The most important products of the region naturally will be studied with the greatest interest. Included in this category are rubber, sack and cordage fibers, and Brazil nuts. Among the products of secondary importance are chocolate, timbó, bananas, guaraná, mandioca starch, resins, dende palm-oil, and coconuts.

The Division of Soils will have as its principal objective the classification and analysis of the soils of the Amazon Valley. Special problems of tropical plant nutrition will be studied under controlled conditions. A soil-analysis labora-



The Instituto from the air.

Picture courtesy Dr. Cesar Pinheiro.



Imposing gateway at the entrance.

Bureau of Plant Industry Photo.

tory will be at the service of the agriculturists of the region.

The Division of Biology will coordinate studies in bacteriology, pathology, entomology, physiology, and systematic botany. It will also be concerned with plant introduction.

A Division of Experiment Stations is indispensable, since the Instituto will supervise a network of experiment stations far removed from each other. It will be the connecting link between the Division of Plant Improvement and the experiment stations. Inasmuch as it is responsible for the experimental projects at the stations, the Division of Experiment Stations will observe and analyze each experiment in collaboration with the Division of Plant Improvement.

The Division of Technology commands a position of vital economic importance in the organization of the Instituto Agronômico do Norte. It not only will increase knowledge of the properties of the most valuable plant products of the northern geoeconomic region, but also will develop methods for improving their commercial qualities.

The need for technological research is most urgent at the present time in the case of rubber. Therefore, experimentation with the physical and chemical properties of rubber, one of the most important items of our foreign and domestic commerce, will be the principal activity of this Division in the immediate future. Most of the experimental investigations of natural Pará rubber have been done with latex from *Hevea brasiliensis*. The original stock from which this was taken came principally from the valley of the Rio Tapajoz. Samples of latex from different rubber trees selected from a single locality exhibit marked differences in physical and chemical properties. The character and effect of these differences as between both localities and species will be studied in the Division of Technology.

Research on latex and rubber is considered of such vital importance to the future of the program to develop a plantation rubber industry in Brazil that a special research laboratory has been equipped at the Instituto. An expert rubber technologist from the National Bureau of Standards of the United States has been invited to supervise its organization and to direct the initial research of this section of the Division of Technology.

The Division of Extension Service will make available to farmers and industrialists of the region the scientific findings and recommendations of the various technical services of the Ministry of Agriculture, including those of the Instituto. This activity may logically be considered somewhat outside the usual sphere of a research institution and it would be preferable for the Instituto that this service be performed through other official organs of the Ministry. Still, in view of the precarious condition of Amazonian agriculture, it seems necessary to organize, in cooperation with the other public services, a joint program of action for planning and promoting the development of the agricultural resources of the Amazon Valley of Brazil. Through this added function, the Instituto Agronômico do Norte will contribute its share toward the immediate improvement of the economy of the northern region.

This Extension Division will collaborate with the Federal Meteorological Service, and thus will be in a position to correlate climatic data with the growth of the plants being studied.

The Extension Division, because of its familiarity with the technical work of the Instituto, will render valuable aid to the Serviço de Colonização in its problem of locating new centers for successful colonization.

With the Serviço de Caça e Pesca (Fish and Game Service), the Division of Extension Service will form a subsection of ichthyology to investigate principally the life history and methods of utilizing the fish known as pirarucú, the basic food of the Amazonian people and an important element in the future economy. This type of collaboration by the Extension Division will enable it to serve as liaison between the new Instituto and similar institutes in Brazil such as the particularly active and progressive Instituto Agronômico of the State of São Paulo.

Other activities of this Division will be the standardization and inspection of Amazonian agricultural products, and the planning of plantations, especially of rubber, which includes the establishing of large nurseries for multiplying and selecting plants of economic importance.

Eventually those phases of the extension work which normally fall under the heading of agricultural development and agricultural economics will be separated from the Instituto and transferred to the respective services of the Ministry

of Agriculture. This relief from extension duties will greatly benefit the Instituto, which should concern itself chiefly with research problems.

The Division of Administration will supervise the work of the technical services and perform its administrative duties through the following sections: health, library, publicity, photography, accounts, and secretarial. The Division will combine certain special technical functions with its administrative functions so as to collaborate closely and efficiently with all of the purely

research and extension divisions.

This exposition is little more than a brief outline of the organization and functions of the Instituto. No statement of its program could, in fact, be complete at this early stage in its development. Plans have gone far enough, however, to demonstrate abundantly that a spirit of collaboration and complete harmony exists among all the agencies concerned. Soon, the Instituto will be in full swing, with the very highest of hopes and prospects for the future.

Rubber Studies Begin

by T. D. MALLERY

AS Dr. Felisberto C. Camargo indicates in the preceding article, rubber research will be among the major activities of the Instituto Agronómico do Norte. It is this enterprise that gives the Instituto a major role in the program of inter-American agricultural relationships.

There is no doubt that Brazil is a key nation in the cooperative program for the development of plantation rubber production in the Western Hemisphere. It is the original home of the Pará rubber tree, as the latter's scientific name, *Hevea brasiliensis*, indicates. It contains vast areas of potential rubber-producing land. Moreover, since its rubber trees are distributed in a number of areas where South American leaf blight is more or less prevalent, it is in a position to furnish large quantities of material to be used in studying this scourge and developing rubber trees that are resistant to it.

Thus, the Brazilian Government's decision to join in the project was fortunate for all the countries concerned, and Brazil, while contributing to the good of all, has placed itself in the strongest possible position to improve and expand its own rubber production on a scientifically sound and economically stable basis.

Brazil's desire to cooperate in the rubber project became known to the Department of Agriculture late in 1940, and soon afterward Dr. E. W. Brandes, in charge of the Office of Rubber Investigations, visited Rio de Janeiro to consult Brazilian Government officials. With them he formulated plans for the personnel and work of a rubber investigations survey party in Brazil.

for the exchange of rubber plant materials and for subsequent rubber experimentation and development in Brazil.

It was learned at this time that the Instituto Agronómico do Norte was under construction at Belém. This was a timely coincidence, since Belém was already regarded as the logical location for a central rubber investigation nursery and experiment station. Accordingly, Dr. Brandes made brief visits to the site of the Instituto during overnight stops at Belém on his flights to and from Rio. On these two occasions, he selected what he regarded as the most suitable land for a rubber nursery.

The next Department of Agriculture representatives to visit this modern agricultural experiment station were the members of Rubber Plant Investigations Survey Party No. 4, who arrived in Belém last December, under the leadership of C. B. Manifold. The survey party remained in the Amazon Valley for several weeks. Its purpose was to obtain promising and representative rubber plant materials for propagation, selection, and multiplication at the Instituto and at similar stations in other cooperating countries. The members of the party were also interested in locating suitable test-planting sites and distribution points for the best high-yielding and disease-resistant clones developed at these stations.

At this time, since a shipment of *Hevea* seeds had just been received from Haiti and other shipments of seeds, budwood, and budded stumps were expected, the work of clearing land for planting was started under the able direction of Dr. Cesar Pinheiro, energetically assisted by

Drs. Hugo Rangel de Borborema and Virgilio G. G. Léo. Some 45 workmen, who at the outset knew little of rubber cultivation and production, have made excellent progress on the formidable task, although it will require several years to claim from the jungle all the land needed for experimental planting.

The first scientist of the Department of Agriculture to work at the Instituto under the cooperative agreement was Loren G. Polhamus, who arrived in Belém in January 1941. He instructed local employees of the Brazilian Ministry of Agriculture in practically all phases of modern rubber culture and production from seed germination and nursery-bed planting to tapping procedure and the manufacture of smoked sheet. Eleven experiments dealing with the treatment and storage of rubber tree seeds were started in collaboration with Dr. Borborema and Dr. Léo, who carried them to completion. Under the guidance of Mr. Polhamus, the first budding of rubber trees with material collected by the survey party was accomplished. Since there were no seedlings available for budding at the Instituto, this work had to be done on young trees at Horto Cipriano Santos and at Horto Gustavo D'Utra plant propagating stations of the Secção

da Agricultura do Pará in the vicinity of the Instituto. Modern tapping methods were introduced on 27 mature 13-year-old trees at the Escola Agricultura near Horto Cipriano Santos.

Mr. Polhamus remained at the Instituto for about 2 months and during the last 2 weeks of that period was associated with Dr. Camargo, who arrived in Belém in mid-February as the newly appointed Director. Appointment of this energetic and enthusiastic Brazilian scientist was hailed by agricultural and industrial leaders of the Amazon region as a guarantee that the work of the experiment station would be productive and that the agriculture of the valley would be greatly advanced.

Rubber experiment work at the Instituto has proceeded in a highly satisfactory manner. Mr. Polhamus was succeeded as principal Department of Agriculture cooperator by the writer, who was in turn succeeded late in 1941 by Hans G. Sorensen. Today, with almost a million seedlings growing at the Belém station and with a good supply of young trees budded with high-yielding disease-resistant strains, plantation rubber production in Brazil is a mighty healthy infant.



Scenes from the Brazilian rubber project: (left) budding a rubber tree; (right) hot-water disinfection of seeds before a jungle lean-to.

LAND OF THE EQUATOR

by PHILIP LEONARD GREEN

IN the months of March and October, when the waves recede from the rocks, the inhabitants of Salinas, Ecuador, go down to the craggy Pacific shore to seek their fortunes. They are in search of golden "pieces of eight," supposed to have been lost along that coast by shipwrecked pirates.

The fable of lost golden riches in the Land of the Equator is not new. The story was known even to Pizarro and it was along Ecuador's shores 4 centuries ago that he sought the realms of gold of which he had heard tales.

When one of Pizarro's lieutenants, Sebastián de Belalcázar, subdued the Kingdom of Quito (the ancient name of the modern Republic of Ecuador), he found considerably less gold than he had expected, but he did find a land containing a varied wealth of farm products. He also encountered an industrious agricultural people, the Caras, who had institutions closely allied to the civilization of their southern neighbors, the Incas.

Ecuador's name (it means equator in Spanish) and location have perhaps been responsible for the generally held impression that it is exclusively a torrid land, but that is not correct. Much of the country is high in the Andes Mountains and it can boast perhaps as wide a variety of climates as any nation in the world. Quito, the capital, is only 15 miles from the equator, but its elevation is so great—9,000 feet—that its average temperature ranges from 50 to 70 degrees. Incidentally, Quito, named for the Quitus Indians, is regarded as the site of the oldest capital in the Americas and it is certainly one of the most picturesque national capitals in the world.

The entire mountainous region of Ecuador is noted for some of the most magnificent natural beauty on earth. It has more than a dozen majestic mountain peaks, all of them at least 16,000 feet high. Better known than the rest are Chimborazo (20,702 feet high) and Cotopaxi (19,495 feet), the highest active volcano in the world. Generally speaking, the "sierra," as this region is called, with its mountains and plateaus, is one of the most healthful spots on the globe for human habitation, and it is there that more than



American National Committee of Engraving.

"El Indio y La Tierra"

(The Indian and the Land)

An Ecuadorian Woodcut by E. Kingman.

two-thirds of the country's inhabitants live.

In addition to its mainland area—divided into the coastal "sierra" and the largely unsettled "oriente" region east of the Andes—the country includes the 13 Galápagos Islands off the coast. It was on these islands, named for the giant tortoises that inhabit them, that Darwin made some of his observations of animal and vegetable life—observations that are believed to have had a profound influence on his theory of evolution.

Ecuador's total population is estimated at more than 2,750,000 people, of whom about 40 percent are a mixture of Spanish and Indian blood. Pure Spanish and pure Indian strains account for another 20 percent each. There is a sprinkling of Negro and Negro-Indian population along part of the Pacific coast.

The country remains today, as it was in early times, a predominantly agricultural land. More than 80 percent of all Ecuadorans are rural people, living outside cities and towns, and tropical

agricultural products are among the leading sources of national wealth.

First Place to Cacao

The leading export has for years been and still is quality cacao, despite the ravages of the dread "witchbroom" disease, which is under intensive study with a view to its control. Although this has caused a steady decline in exports ever since 1920, Ecuador still sends out over 40,000,000 pounds of cacao annually.

In second place is coffee, of which over 30,000,000 pounds are shipped abroad annually. It is estimated that over 50,000 coffee trees are under cultivation. Bananas, grown in the neighborhood of the Guayas River, are exported to Peru, Chile, and the United States. Production is not on as large a scale as in some of the other countries but environmental conditions are satisfactory for the growing of this crop.

Corn, cotton, potatoes, rice, and tobacco are also grown but not on a sufficiently large scale for export and there is some livestock farming in the interior. Other products are grown or produced for regional or national consumption and enter export trade only occasionally. In the Ambato district, for instance, delicious strawberries, grapes, apples, pears, and plums are produced. The Latacunga region is known for its milk, butter, and cheese. Certain coastal districts produce pineapples of rare excellence.

An Ecuadoran fruit not found elsewhere is the *naranjilla*, which combines the tastes of grapefruit, pineapple, and raspberry and is used for ice-cream flavoring and for soft drinks.

The Andean slopes have extensive stands of a variety of tropical hardwoods but, due to difficulties of marketing, few of these are exported. One wood that does enter foreign trade is the red mangrove, rich in tannin, which is used for tanning leathers.

Tagua nuts are an Ecuadoran export. Known to the trade as "vegetable ivory," they come from a species of palm tree and are used mainly for making buttons. About \$1,000,000 worth of an unusually high grade of species of kapok is exported annually. This is an insulating material known commonly as "tree cotton." Balsa wood is another important product. It is extremely light in weight, yet strong enough for many important uses, including those in connection with defense.

Agriculturally, Ecuador faces many difficult problems. Extensive areas would benefit by irrigation and much of the land, tilled for centuries, needs fertilizer. Plant diseases inflict serious damage almost every year. Above all, the country needs to produce a greater variety of crops if it is to provide a more stable income for the population at large and farmers in particular.

These are among the problems to be taken up by a mission which recently left the United States, under the auspices of the Department of Agriculture, to make perhaps the most complete survey ever undertaken of agriculture in Ecuador. Particular attention will be given to the possible development of rubber cultivation, the production of coarse wools for export, and the reestablishment of the high-quality cacao business on something like its former scale. Preliminary surveys have already been made with regard to both rubber production and agriculture in general at the request of the Ecuadoran Government.

Resources Underground

Of course, Ecuador's resources are not entirely agricultural. Gold is the most important mineral, annual production being valued at about 2½ million dollars. Other minerals include copper, lead, magnesium, marble, and sulphur. More than 2 million barrels of oil are produced annually, chiefly from oil fields on the Santa Elena Peninsula, not far from Guayaquil, Ecuador's largest city and chief seaport. A substantial amount of this oil is exported and much of the remainder is consumed in Guayaquil.

Manufacturing industries are surprisingly varied, although they are naturally not on a big scale when compared with those in countries of larger population. Among Ecuador's manufactures, the most famous are the *toquilla* or *jipijapa* straw hats, mistakenly called "Panama" hats because people from the United States first saw them on sale in Panama. These hats are not made under water, as some writers have stated, but the straw must be kept fairly moist while being worked. About 15,000 dozen of these "Panama" hats are exported each year.

Ecuador also manufactures some textiles, enough that it exports small quantities to neighboring Colombia. This industry, with mills at Ambato, Antunataqui, Quito, and Riobamba em-



Quito from a church tower.

employs about 4,000 people. Shoe factories, ice plants, breweries, tanning factories, and flour mills also contribute to the country's industry. Rayon fabrics, rubber goods, toilet preparations, drugs and medicines, cement, leather, soap, sisal, fiber bags, liquor, perfumes, and certain oils are made in Ecuador, too. Alcohol, matches, salt, and tobacco are government monopolies.

Like many another country of the Andean region, Ecuador is lacking in good highways. Some serviceable roads exist, of course. It is possible to go by automobile from Quito to Bogotá, the capital of Colombia. On the whole, however, the system is inadequate and a good part of the \$1,150,000 recently made available by the Export-Import Bank is to be used to remedy this situation.

The Guayaquil-Quito Railway has the reputation of being one of the most efficiently operated transportation systems in western South America. Its construction was an unusual engineering feat, as anyone who has ever seen Ecuador's mountains can testify. Connections with the outside world are good, both by steamer (9 days



Panagra Photos.

Indian mother and children in Ecuador.

from New York) and by air (a day and a half).

Education has always occupied an important place in the life of Ecuador. The Central University of Quito looks back upon a life that began in 1787. The cities of Guayaquil and Cuenca also have their universities.

In literature and the arts, Ecuador has produced some of Latin America's leading lights. Juan Montalvo, who wrote a life of George Washington, is accounted one of the outstanding South American writers of all time.

Ecuador's music has a haunting quality which is difficult to appreciate without hearing it. Perhaps it is best described as an artful combination of alternately sad and joyous strains, reflecting both the Indian and the Spanish influences. The *pasillo*, the *yaraví*, and the *San Juan* are three types of music well loved in Ecuador. Frequently, even on a city street, one may encounter a country Indian playing a doleful tune on his *quena*--a reed instrument that somewhat resembles one-half of a set of organ pipes in miniature.

The artistic work in the churches of Quito is famed far and wide. Money and care have been

lashed on some of the gold scroll work to be found there.

Milk, Labor, and Farming

In the realm of social progress also, Ecuador may be justly proud of its accomplishments. Many young women of social prominence now work incessantly to improve conditions among girls of the laboring class. The Gota de Leche (Drop of Milk) movement is active in Ecuador as well as in a number of other Latin American countries in distributing milk to those who cannot purchase it.

Ecuador's Labor Code, of August 5, 1938, not only provides an 8-hour day and a 44-hour week for laborers generally but also contains a number of provisions especially for the benefit of farm labor. One of these protects farm workers against the deduction of more than 25 percent from their wages to pay for their food. Another requires employers to furnish agricultural workers with adequate housing and fuel and with enough free pasture for 3 cattle and 20 sheep.

Yet there is much to be done and wages are low.

In recent years, Ecuador has lost a considerable part of its world markets, mostly in coffee and cacao, but trade relations with the United States have improved steadily. Under a trade agreement effective since October 23, 1938, Ecuador made tariff concessions to this country on 33 items, while the United States put such tropical products as bananas, cacao, coffee, and tagua nuts on the free list. Another instance of Ecuador's traditionally friendly relationships with the United States is an agreement of December 1940, under which naval and military missions were received from this country.

Ecuador, it will be seen, is a combination of much that is old with much that is new. Although many phases of its life have become modernized, one cannot come to know the country without recognizing that here is a land that has preserved to a remarkable extent the ancient Hispanic influences on a rich Indian background that give a special charm to so many of our neighbor nations of the Americas.

Survey Group in Ecuador

A VERSATILE group of agricultural technicians makes up the Ecuadoran Economic Resources Mission, now engaged in the survey of Ecuador referred to in the above article. The Mission is headed by Ernest G. Holt, Chief of the Biology Division of the Soil Conservation Service, who has had extensive experience in Brazil, Venezuela, and other Latin-American countries. Only last year he was on loan to the Rockefeller Foundation for special investigations relating to jungle yellow fever in Brazil.

Edwin R. Kinnear, also of the Soil Conservation Service, is engineer and assistant leader. He has had many years of experience in different types of engineering, including work in Canada, Cuba, El Salvador, and Puerto Rico.

Walter R. Schreiber, of the Office of Foreign Agricultural Relations, is serving as economist and marketing specialist. He has represented the United States in agricultural work in Europe and more recently made a survey of the oil seed and nut crops of Brazil.

John M. Cooper, animal husbandman of the Mission, is from the Office of Indian Affairs of the Department of the Interior, with which he holds the position of Director of the Southwestern Range and Sheep Breeding Laboratory at Fort Wingate, N. Mex. He is making a special study of all factors affecting sheep and wool production in Ecuador, especially in the production of carpet wool.

Lee Hines, serving as pathologist and rubber specialist, is a member of the staff of the Bureau of Plant Industry and has been pathologist of the Tung Experiment Station at Bogalusa, La.

Benjamin J. Birdsall, experienced in work with tropical soils and plantation banana production with the United Fruit Company, is the Mission's soil scientist.

William A. Larnier, Jr., who as administrative assistant will handle the business and secretarial affairs of the Mission, served with a previous Ecuadoran expedition, sponsored by the Smithsonian Institution.

A NEW LINK WITH ARGENTINA

by LOUIS C. NOLAN

“A NEW link in the chain of friendship, peace, and good neighborliness” that binds the American Republics together was forged on October 14, when a trade agreement between the United States and Argentina was signed. The quoted words are those of President Roosevelt in a message to Argentine Acting President Ramón S. Castillo, who, in response, described the agreement as “of overwhelming historical importance.”

The agreement, the first accord since 1853 governing trade relations between the United States and Argentina, was signed at Buenos Aires by Argentine Foreign Minister Enrique Ruiz Guinazu and United States Ambassador Norman Armour and became effective November 15. It contains specific provisions designed to stimulate trade in items of merchandise which in 1939 represented about two-thirds of the trade between the two republics and general provisions to affect all commerce between them.

The program of reciprocal trade agreements, in which the Argentine accord is the latest development, has in recent years represented United States policy with regard to foreign commerce. It is a recognition of our conviction as a nation that international trade is the basis of international friendship and that such friendship can flourish only when trade is relatively unrestricted.

Argentina is the twelfth Latin-American republic with which the United States has signed a trade agreement in carrying out this policy. The other countries, in the order of their signing, are Cuba, Brazil, Haiti, Colombia, Honduras, Nicaragua, Guatemala, Costa Rica, El Salvador, Ecuador, and Venezuela. Notice has been given of intention to negotiate agreements with two others, Chile and Uruguay, and it has been announced that preliminary negotiations with Mexico have been undertaken. This network of inter-American agreements is the nucleus of our hopes for maintaining the semblance of normal trade relationships at the present time and rebuilding the structure of world trade after the war.

Until this year a major flaw in the fabric has been the lack of an agreement with Argentina, which surpasses all other Latin-American republics in the volume of its foreign trade. The desirability of such an agreement has long been recognized, and there have been extended negotiations; but until this year the negotiators have always run up against obstacles that could not be overcome. Today, however, the European threat to Western Hemispheric freedom and institutions has thrown a new light on some of our values. As the idea is expressed in the final declaration of the 1941 National Foreign Trade Convention, the current situation calls for “re-examination to determine whether the feeding of a small part of our vast domestic market would not so greatly increase the purchasing power of Latin America for other products of the United States that the resultant benefits to all would fully compensate, on a national basis, for any negligible effect on domestic production.” In other words, it is recognized that the national interest far outranks any other concern in the tasks that the Americas face.

Under this impetus, the Argentine and the United States governments have worked out, item by item, a trade agreement that involves the least possible sacrifice and the greatest possible benefit for both nations. The circumstances in which the war and hemisphere defense activities have placed both Argentina and the United States should enable each of the two nations to make with a minimum of difficulty whatever adjustments may be necessary in its own national economy.

Concessions by Argentina

Specific concessions granted to the United States by Argentina cover items of trade which in 1939 were valued at about 33 million dollars and represented about 47 percent of our merchandise exports to Argentina in that year. Since Argentina consumes more *industrial* products than it manufactures, while producing more basic *agricultural* products than it consumes, most of the concessions naturally are on industrial products.

Concessions cover such items as automobiles,

parts, and accessories; radio apparatus; automatic refrigerators and parts; agricultural implements and machinery; industrial machinery; office appliances; lumber and naval stores; paper products; chemicals; paints and related products; motion-picture film; and miscellaneous manufactured products. In giving the United States an opportunity to fill Argentine needs for these products, the Argentine Government has been willing to accept the possibility of a decrease in tariff revenues that are an important source of its income.

For United States business, these concessions furnish an opportunity to establish or strengthen its market in Argentina, and United States farmers will benefit to the extent that United States industrial exports to the Argentine increase and, in turn, increase the domestic purchasing power of factory and urban workers generally.

A number of concessions made by Argentina will be of direct advantage to farmers in this country. Agricultural products on which concessions were received include fresh apples, pears, and grapes; dried pitted peaches, apples, pears, and cherries; prunes; raisins, unshelled walnuts; and tobacco products.

On imports of fresh apples, pears, and grapes from the United States, the Argentine duty is cut in half. The lowered duty on these fresh fruits is seasonal, applying from October 1 to January 31 on apples; from October 1 to December 31 on pears; and from September 1 to November 30 on grapes. Since Argentina's seasons are reversed from ours, its domestically grown fruit is off the market in these periods and United States fresh fruit normally enjoys its best market there.

At the time the agreement was signed, dried pitted peaches, apples, pears, and cherries from the United States already were enjoying favorable tariff rates on entry into Argentina. These rates, 35 percent below the general Argentine tariff rate, accrued to the United States through generalization of a provision in an earlier Argentine agreement with Chile. Until the present agreement was signed, however, U. S. exporters had no assurance that these favorable rates would continue. In the agreement they are bound against increases.

While this same situation also applied to walnuts from the United States, entitling them to a tariff rate 50 percent below the general rate,

much difficulty had been experienced by Argentine importers in securing exchange that would enable them to import any United States walnuts. In the agreement, some exchange for this purpose is definitely assured.

The other United States dried fruits mentioned in the agreement benefit by duty reductions that amount to 30 percent for prunes and 35 percent for raisins. Tobacco products involved are leaf and cut tobacco and cigarettes, all of which are bound against increases in present favorable tariff rates.

General Assurances

Certain general assurances contained in the agreement, or in notes exchanged between the two governments and forming an integral part of the agreement, also should be of value to the United States.

This country is assured of nondiscriminatory treatment generally in the matter of Argentine exchange control and import restrictions, which since 1933 have characterized Argentine commercial policy and in some instances have been a greater barrier to United States imports into Argentina than tariffs themselves. Exception in these provisions is made, however, in the case of special exchange or quota facilities which Argentina may arrange with contiguous countries and Peru; and temporarily in case of the so-called "sterling area."

United States exporters also will receive most-favored-nation treatment in the matter of future tariff concessions by Argentina, except for such special tariff concessions as are made in trade agreements to contiguous South American countries. Argentina under the agreement likewise will receive comparable most-favored-nation treatment from the United States, except for special trade concessions made by the United States to Cuba.

Another encouraging assurance for United States exporters is that the Argentine Government will grant some exchange, at least, for every product on which it has made a concession in the agreement to the United States. This specific provision supplements that government's general assurance of nondiscrimination in exchange treatment. These general assurances are expected to be of increasing value as Argen-

tina's available supply of dollar exchange increases under the stimulus of more United States purchases in Argentina.

Concessions by the U. S.

The concessions granted to Argentina by the United States cover import items that in 1939 were valued at about 54 million dollars and accounted for 92 percent of the merchandise imported for consumption from Argentina that year. Most of these concessions, which consist of reductions in import duties, bindings of existing rates, and bindings on the free list, are on agricultural commodities.

Agricultural products from Argentina on which duty or import excise-tax reductions are made include casein, neat's-foot oil and stock, tallow, oleo oil and stearin, meat extract, quince jellies and related products, certain prepared and preserved meats (chiefly canned corned beef and pickled or cured beef and veal), flaxseed, canary seed, corned-beef hash, broomcorn, carpet and coarse apparel wools, cattle hides, and dog food. Off-season duty reductions are made on fresh asparagus, grapes, plums, and prunes. Duty reductions also are made on Italian-type cheese, preserved or prepared tomatoes and sunflower oil, although the United States reserves the right to withdraw these concessions after the conclusion of the war, provided 6 months' written notice is given the Argentine Government.

The existing duties on pears, processed yerba maté and alfalfa seed are bound against increase. Incidentally, in an exchange of notes in connection with the agreement, provision was made for early consideration by a mixed commission of the question of limiting Argentine pear exports to the United States. A number of other agricultural commodities in the agreement are bound on the free list. Among these are crude maté; dried blood; crude bones; bone dust, meal, and ash; animal carbon for fertilizer; tankage, unmanufactured hoofs and horns; sausage casings; horse, colt, and ass hides and raw skins; carpincho skins; and raw sheep, lamb, goat, and kid skins.

Of the agricultural products listed, flaxseed, canned corned beef, cattle hides and skins, coarse wools, and casein deserve further discussion.

Flax, one of the lesser grain crops of the United States, is grown chiefly for the seed, which is crushed to produce linseed oil, one of the most important commercial drying oils used in the manufacture of paints and varnishes. Domestic production of flaxseed is not sufficient, year in and year out, to meet the Nation's requirements. Even the bumper domestic crop of 1941 will probably fall at least a third short of meeting the Nation's needs during the current season. In Argentina, in contrast, flax is a major crop and a substantial surplus of exportable seed now exists.

United States tariff treatment of flaxseed has varied widely in the past. In the Act of 1913 the duty was fixed at 20 cents per bushel. During the 1920's it was raised by degrees from 20 to 56 cents, and finally in 1930 to 65 cents. Under the agreement the duty is reduced to 50 cents, with a further reduction to 32½ cents for the duration of the existing abnormal situation in the flaxseed trade. The duty will revert to 50 cents a bushel 30 days after the President of the United States proclaims that the abnormal situation is ended. While the emergency continues, paralleled by the usual deficit domestic production, the temporary reduction from 50 to 32½ cents is expected to be offset, in whole or in part, by unusually high transportation charges.

Fresh Meats Not Affected

Fresh meats are not affected by the agreement. On prepared or preserved meats, however, the specific duty is reduced from 6 to 3 cents per pound, provided the 3 cents is not less than the 20 percent ad valorem provided in the Act of 1930. Canned corned beef is the principal product included in this concession. Domestic production of canned beef has been relatively small in recent years, and this limited output has consisted largely of beef specialties other than corned beef, production of the latter having been confined chiefly to filling Government contracts for the Army, Navy, and Civilian Conservation Corps. Much of the domestic beef from so-called "canner" cattle now is used for sausage, which is a more profitable outlet.

Imports of canned-meat products on which concessions are made in the agreement have never been large in comparison with the total United States output of beef and veal, and in

1940 they amounted to less than 2 percent of domestic production. Even this small share in the United States market is important to Argentine farmers, who are suffering severely from the loss of European markets for their meats.

Four-fifths of the wools covered in this agreement are of the coarse type (not finer than 40's) imported in bond for the manufacture of carpeting. This carpet wool is bound, in effect, on the free list. On this same type of wool not imported for use in the manufacture of carpets a flat reduction of 11 cents per pound of clean content is made; and on the improved or apparel wools (40's and 44's) a flat reduction of 12 cents per pound is made.

Production of true carpet wools has virtually disappeared from this country. Domestic production of the grades of wool on which duty reductions are made is relatively small and for a number of years has been declining. During the past 6 years annual imports from all countries of the three types of wool covered in the agreement averaged about 118.4 million pounds, four-fifths of which consisted of the duty-free type.

Casein, a relatively minor product of the dairy industry, is derived from skim milk and is used mainly as a surface coating on paper and as an ingredient in water-resistant glues, water colors, and oil paints. Under the Argentine agreement the duty on this product is reduced from $5\frac{1}{2}$ to $2\frac{3}{4}$ cents a pound, although it remains one-fourth of a cent a pound higher than in the Tariff Act of 1922.

Domestic production of casein is affected primarily by casein prices and by the supply of and demand for butter, condensed milk, and cheese, the three principal manufactured products into which whole milk may be converted. In periods of domestic shortages of casein, the nation is dependent upon outside sources for supplies. Under the stress of the war, with cheese and evaporated milk much in demand, the domestic supply of casein has run unusually short in recent months.

To Argentine farmers, the prospect for increased sales of these products on which their country has received concessions is good news. United States farmers, benefiting from a near-record domestic demand for many of their principal crops and looking forward to their highest annual cash income since 1920, need not feel

disturbed over the importation of small additional quantities of Argentine agricultural products; especially since they, in common with all other groups of Americans, will benefit from any increased trade which may result from the agreement.

OTHER INTER-AMERICAN TRADE AGREEMENTS

Following is a chronological list of the United States trade agreements with other American republics:

Cuba—signed Aug. 24, 1934; effective Sept. 3, 1934. Supplementary agreement signed Dec. 18, 1939; effective Dec. 23, 1939.

Brazil—signed Feb. 2, 1935; effective Jan. 1, 1936.

Haiti—signed March 28, 1935; effective June 3, 1935.

Colombia—signed Sept. 13, 1935; effective May 20, 1936.

Honduras—signed Dec. 18, 1935; effective March 2, 1936.

Nicaragua—signed March 11, 1936; effective Oct. 1, 1936. (Certain provisions for this agreement ceased to be in force as of March 10, 1938.)

Guatemala—signed April 24, 1936; effective June 15, 1936.

Costa Rica—signed Nov. 28, 1936; effective Aug. 2, 1937.

El Salvador—signed Feb. 19, 1937; effective May 31, 1937.

Ecuador—signed Aug. 6, 1938; effective Oct. 23, 1938.

Venezuela—signed Nov. 6, 1939; effective Dec. 16, 1939.

Argentina—signed Oct. 14, 1941; effective Nov. 15, 1941.

Official notice of intention to negotiate an agreement was given Oct. 2, 1939, in the case of Chile and May 13, 1941, in the case of Uruguay. Notice of intention to negotiate a further supplementary agreement with Cuba was given July 26, 1941.

The United States also has a trade agreement with Canada, which was signed Nov. 15, 1938, revised Nov. 17, 1938, and supplemented by further agreements of Dec. 30, 1939, and Dec. 13, 1940.

AGRICULTURAL FRONT

HATCHING EGGS SHIPPED BY AIR

To overcome transportation difficulties that have in the past retarded shipment of improved United States poultry stock to South America, the shipment of hatching eggs by air express is being tested. Two small shipments totaling 400 eggs were recently sent to Argentina for use in experimental poultry breeding work by the Argentine Ministry of Agriculture.

The eggs were sent in response to a request from Felipe A. Espil, Argentine Ambassador to the United States, who asked cooperation of the Department of Agriculture in locating poultry-breeding stock for use of the Argentine Government. For the long flight, the eggs were packed in sawdust as a protection against temperature changes in a similar manner to that used for transcontinental shipments within the United States.

The eggs, of "register of merit" quality, the highest standard produced under the national poultry improvement plan, will aid in introducing egg-laying poultry of this quality to Argentina. Poultrymen believe that air shipment of hatching eggs to distant countries will have distinct advantages over previous methods. They anticipate that a high percentage hatch can be secured and that the chicks will adjust themselves, as they develop, to local climatic conditions.

NEW SCIENTIFIC ORGANIZATION

A new scientific organization of interest to agriculturists is the Instituto Ecuatoriano de Ciencias Naturales (Ecuadoran Institute of Natural Sciences), recently organized in Quito. Its members are anxious to collaborate with scientists throughout the Americas and invite interchange of material and publication with workers in all the natural sciences. The Institute is headed by Prof. M. Acosta Solis, Director-Founder, to whom inquiries may be addressed at Apartado 403, Quito, Ecuador.

SOUTH AMERICA WANTS CONSERVATION

The need for a soil-conservation program in South America is being increasingly realized on that continent, according to Ernest E. Maes, of the Albuquerque, N. Mex., office of the U. S. Soil Conservation Service. Mr. Maes, on loan to the Office of Indian Affairs of the Interior Department, is touring all countries of South America, studying the administration of Indian affairs.

MEXICO HONORED

Mexico was the "guest of honor" and agriculture was the theme as the city of Waterloo, Iowa, observed Pan American Week recently. Attend-



ing as representatives of the country "south of the border" were Salvadore Duhart, secretary, and Gonzalo Blanco Macías, agricultural attaché, of the Mexican Embassy in Washington.

In the picture, Señor Duhart (left) is shown with Mayor R. B. Slippery, of Waterloo (right), conversing with an Iowan whose farm they visited.

PUERTO RICANS TOLD OF NEW OIL

Extraction from coffee flowers of an essential oil suitable for perfumes was among the tropical crop experiments described to the Puerto Rican chapter of the American Society of Agricultural

Sciences at its Columbus Day meeting at Mayagüez. The development was explained to the group by Mrs. Noemí García de Arrillaga, a chemist in the Puerto Rican tropical experiment station of the U. S. Department of Agriculture. Samples of the oil were reported as having been highly praised by essential oil dealers in "blindfold" tests.

Another Department chemist, Miss Francisca Arana, outlined the chemistry of vanilla processing. There was group discussion of such topics as orchid culture, mangosteen production, the production of wine from orange juice, the growing of insecticide plants, and the properties of tropical drug plants. It was agreed that reforestation of extensive Caribbean areas with tropical woods is urgent.

Puerto Rico's is the largest chapter of the American Society of Agricultural Sciences.

AMERICAN FOLK MUSIC SUNG

Folk music of all the Americas featured the daily songfests at the 1941 New York State Fair. Rural delegations from all over the State participated, under the leadership of Max V. Exner, rural music specialist.

FIQUE, COLOMBIAN FIBER

Fique, a native fiber plant of Colombia, is being widely used as a substitute for sisal and jute. Most of the Colombian coffee entering commercial channels is now packed in bags made from fique.

Commercial development of the fiber is still relatively new and importation of some jute and sisal is necessary to supplement domestic supplies. However, a bill has been introduced into the Colombian Senate which provides for financial aid and distribution of fique seed, in addition to furnishing technical aid by the establishment of an experimental school at Onzaga, State of Santander, approximate center of the fique-growing region. It is believed that with government aid, a surplus of fique could be produced for export.

READING

About the Americas

(This department has been established because of numerous requests for suggested reading material on the Americas. Inclusion in or omission from the list should not be regarded as appraisal of a publication.)

Spain and America, Doris K. Arjona, Rose L. Friedman, and Esther P. Carajal; 430 pp., Scott, Foresman & Co., Chicago, 1940. A second-year Spanish reader with exercises, describing Spain and Spanish America. Good selection of pictures and classified picture list.

New Directions in the New World, Adolf A. Berle, Jr.; 141 pp., Harper & Brothers, New York, 1940. Economic patterns in the Western Hemisphere of the future.

Geography of Latin America, Fred A. Carlson; 642 pp., Prentice-Hall, Inc., New York, 1940. Thorough over-all and regional treatment. Pronouncing list.

Defense of the Americas, Andre Cheradame; 306 pp., Doubleday, Doran & Co., New York, 1941. Deals with safety of the Americas in light of German plans and activities.

Jewish Life in South America, J. X. Cohen; 195 pp., Bloch Publishing Co., New York, 1941. A survey study of Jewish communities for the American Jewish Congress.

Commodity Year Book, 1941; 636 pp., Commodity Research Bureau, New York. Charts and textual material relating to production and movement of selected commodities.

Economic Relations of the United States with Latin America, Ethel B. Dietrich; 48 pp., American Association of University Women, Washington, D. C., 1941. Emergency and long-time economic relations. Map.

Beyond the Equator, Joseph A. Loewensohn; 75 pp., Fortune's, New York, 1940. Short travel account.

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Robert H. Ingram, Editor

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Juan Carlos Blanco — *Our Mutual Friend*

ON a map of the huge continent of South America, Uruguay appears tiny. Actually, it is considerably larger than England, and it is a thoroughly modern nation with an outstanding record of social progress.

As a major member of the Western Hemisphere family of nations, Uruguay's voice has long been raised in the cause of democracy and its ties with the United States have grown steadily closer as the world emergency has spread. So important has this inter-American relationship become that this year the respective legations of the two countries were elevated to embassy rank.

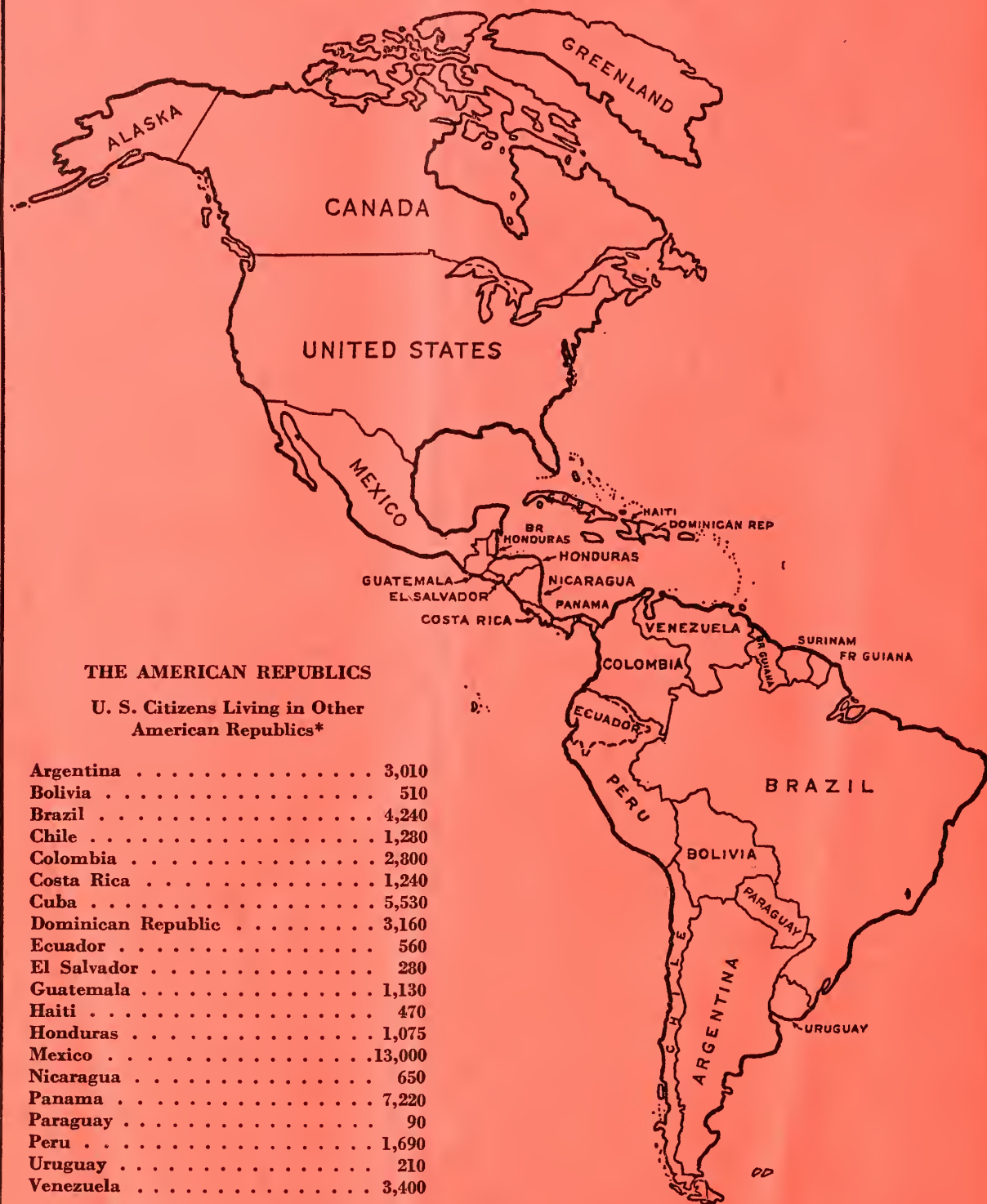
First Ambassador from Uruguay to the United States under the new agreement was Dr. Juan Carlos Blanco, who took up his new post in Washington last September. Such an assignment might have daunted a less experienced diplomat, but it was nothing new for Dr. Blanco, who had previously served as his country's first Ambassador to Argentina and to Brazil.

Following graduation from the University of Montevideo with the degree of doctor in laws and service on its faculty as professor of literature and constitution, Dr. Blanco launched a public career that has been marked by a great variety of activities.

He was a member of the Uruguayan Chamber of Deputies and served the national government as Home Secretary, Minister of Public Works, and Minister for Foreign Affairs. He represented Uruguay on the Council of the League of Nations and in the diplomatic field was for 9 years Minister Plenipotentiary in Paris, in addition to the Argentine and Brazilian posts already mentioned. He also served as Minister Plenipotentiary in charge of a special mission to the United States.

As both a literary man and a lawyer, Dr. Blanco has long been interested in a number of public questions that are much discussed today. He is the author of "Ports and Free Ports," "Lessons About War," and "Ports and Public Works."

Among the decorations with which his international services have been rewarded are the Grand Cross of the Legion of Honor of France, the Grand Cross of the British Empire, the Grand Cross of Polonia Restituta, the Grand Cross of the Cruzeiro do Sul of Brazil, the Grand Cross of Simón Bolívar of Venezuela, the Grand Cross of the Crown of Italy, the Medal of Merit of Chile, and many others.



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